

Photo : AEP, UK model

AEP Model
UK Model
E Model

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COMPACT HI-DENSITY COMPONENT SYSTEM

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SAFETY-RELATED COMPONENT WARNING!!

COMPONENTS IDENTIFIED BY SHADING AND MARK  ON THE SCHEMATIC DIAGRAMS, EXPLODED VIEWS AND IN THE PARTS LIST ARE CRITICAL TO SAFE OPERATION. REPLACE THESE COMPONENTS WITH SONY PARTS WHOSE PART NUMBERS APPEAR AS SHOWN IN THIS MANUAL OR IN SUPPLEMENTS PUBLISHED BY SONY.



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SERVICE MANUAL

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Handling Precautions for MOS ICs

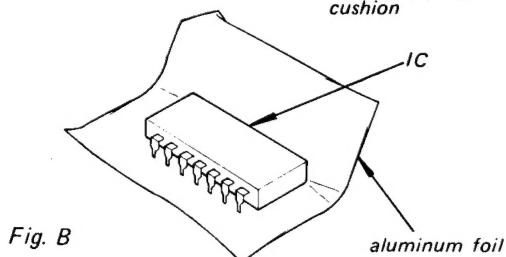
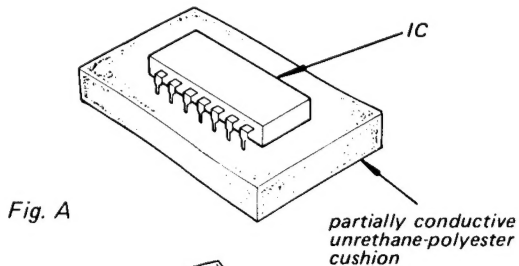
Generally, the insulation resistance of the oxide layer in MOS IC structures is very high, and the oxide layer is very thin. Because of this, it is possible that the static voltages usually present on clothes and the human body will be enough to generate a potential difference across the insulator, high enough to cause a breakdown of the insulating layer.

The following precautions should be taken while handling these ICs.

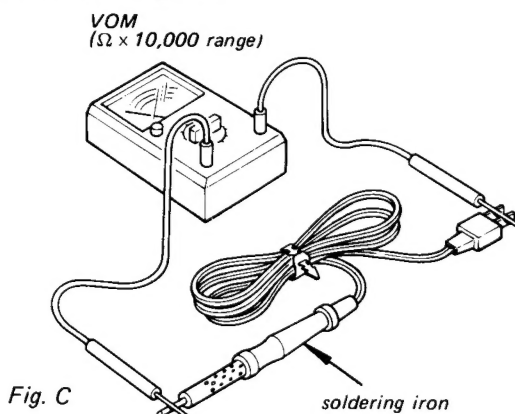
(Particular care should be taken under conditions of low humidity.)

Precautions in Replacing MOS ICs

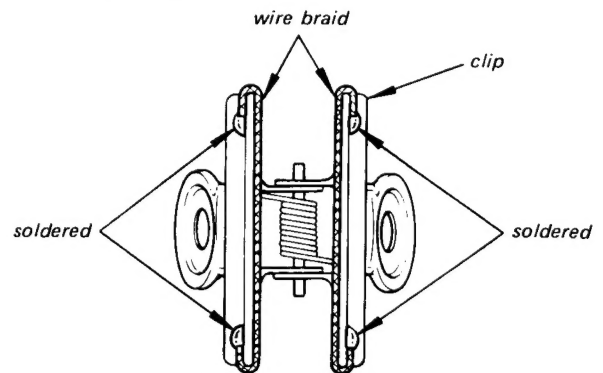
1. Store new ICs by inserting them into a urethane-polyester cushion (which is somewhat conductive), or wrapping it in aluminum foil, so that all the pins are at the same potential. (The ICs should be stored in that manner until mounted on the circuit board.)



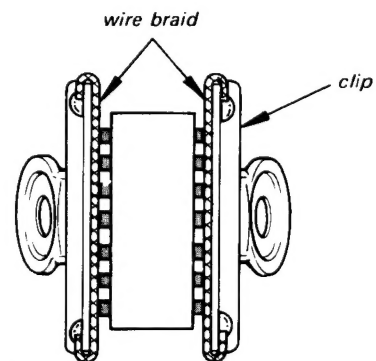
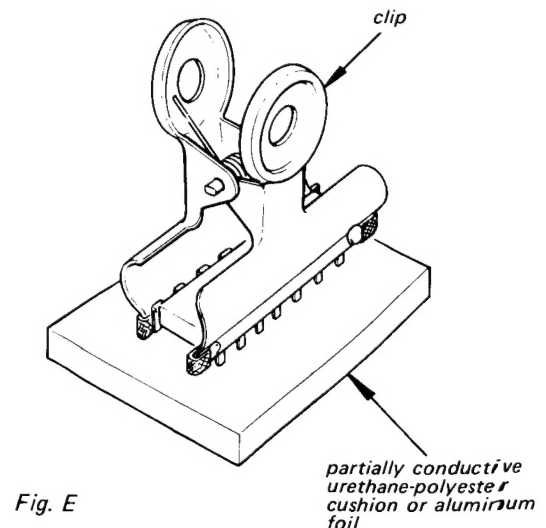
2. Check the soldering iron for possible power-line leakage current. Make sure that there is no leakage path by connecting an ohmmeter to the tip of the soldering iron and the plug as shown in Fig. C. If there is a leakage path, use some other soldering iron.



3. Equalize any potential difference between the clothes, the tools in use, the work bench, the set being worked on, and the packaged IC by touching them all in succession with the hands or a conductive wire or tool.
4. The following are effective methods for handling ICs that remove the potential difference across the oxide layer.
 - Use a paper clip modified by soldering in a wire braid insert.



Make sure that there is no solder on the inside.



Make sure that all the pins are in contact with the wire braid (all the pins will then be at the same potential.).

- Take a short length of fine bare wire and wind it around the IC so that it shorts all the pins of the IC, while it is still in the urethane-polyester cushion or aluminum foil. This ensures that all the pins are at the same potential.

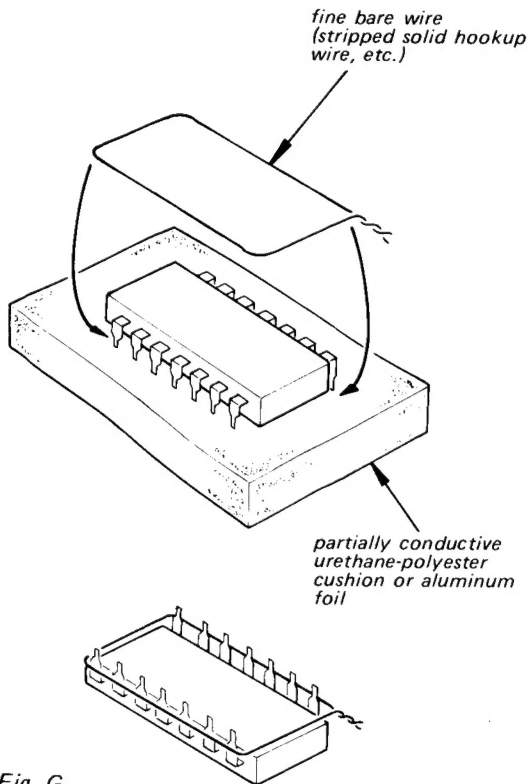


Fig. G

- When it is necessary to handle the IC with the fingers, do not touch any pin, and hold the IC at the ends of its plastic-package case as shown in Fig. H.

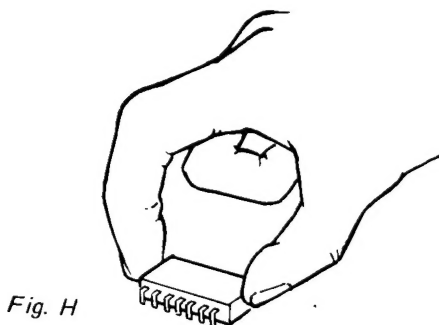


Fig. H

5. Method of Mounting

Insert the IC while holding it with the modified clip, and solder all the pins with the clip still shorting the pins. (Similarly, solder all the pins while the bare shorting wire is still wound around them.). Remove the clip or the bare shorting wire only after all the pins have been soldered.

Precaution while Checking C-MOS ICs

The C-MOS ICs (Complementary MOS) are MOS ICs that have their output sections made up of N-channel and P-channel push-pull stages to increase their speed of operation. If the output terminal of these ICs comes into contact with B+ or B- voltage, then the FET which is ON at that time will either become shorted or open.

This is valid for all the output sections that are connected together by the interconnections. Even the circuits that are physically separated (and not on the same board) can be destroyed simultaneously.

Example:

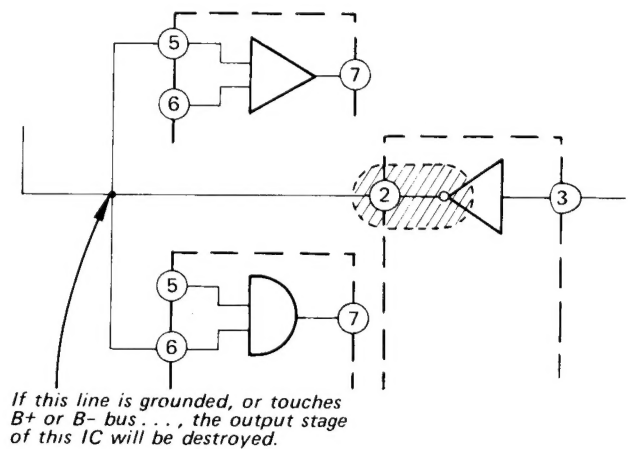


Fig. I

CAUTION ON POWER SUPPLY

There are two ways of power supply in FH-7. One is by AC-78 using AC power supply, the other is by DC power unit EBP-78 (optional accessory). Each of them has different signal path and B+ bus mutually.

- **THE CASE BY AC-78 USING AC POWER SUPPLY**

There are five B+ buses from AC-78, +DC (AC power supply), +VccH, -VccH, +Vcc and -Vcc. +DC (AC power supply) is supplied to ST-78 (or ST-78S), TA-78 and TC-78, also +VccH, -VccH, +Vcc and -Vcc are supplied to TA-78 only. These four B+ buses to TA-78 are for IC103 (L-CH) and IC104 (R-CH) as the power amplifier in TA-78. Signals from each set are amplified at IC103, 104 and drive the speakers.

- **THE CASE BY EBP-78 (optional accessory)**

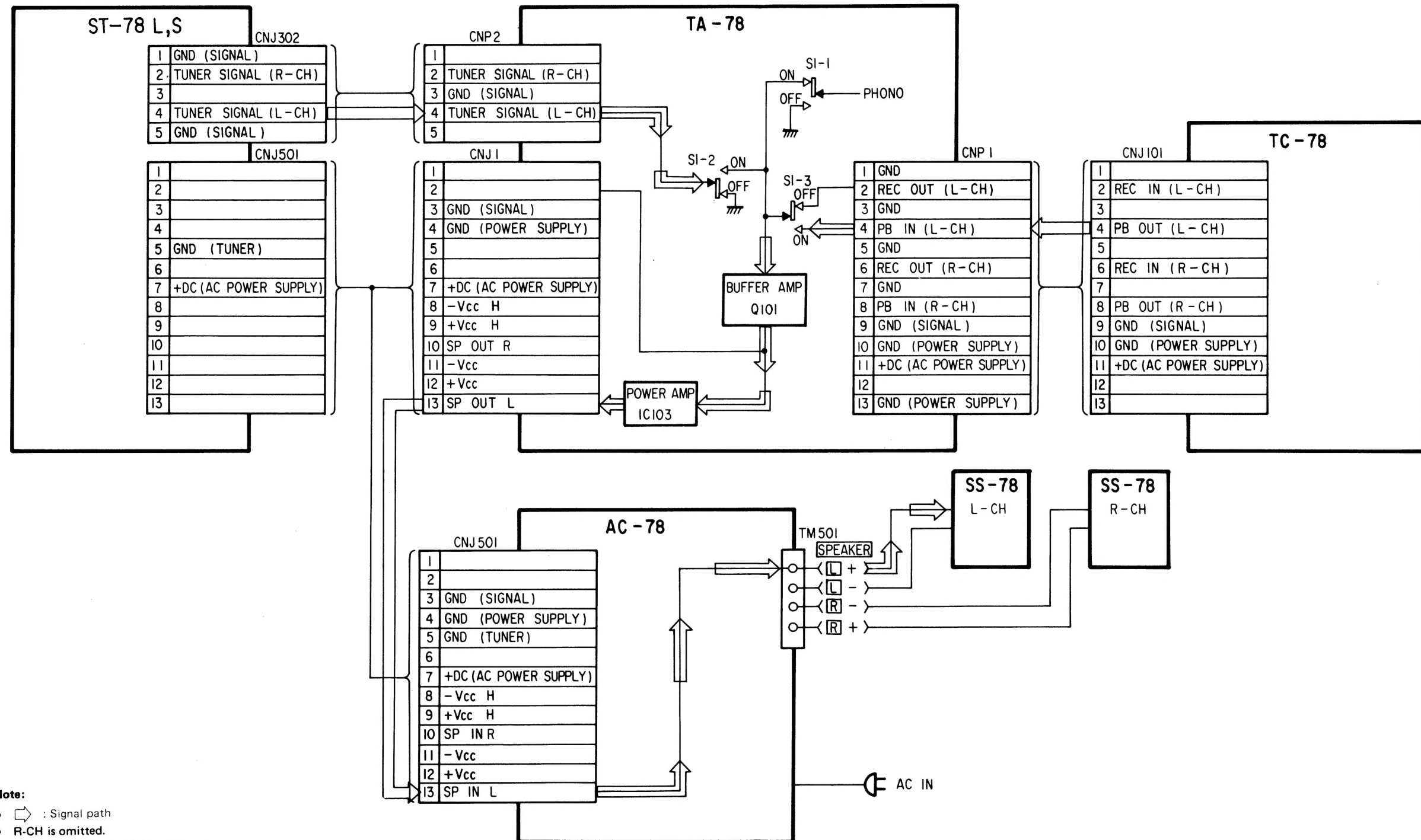
B+ bus from EBP-78 is only +DC (DC power supply), and this B+ bus is supplied to ST-78L (or ST-78S), TA-78 and TC-78.

According to one B+ bus by +DC (DC power supply), power is not supplied to IC103, 104 as the power amplifier in TA-78, so there is no amplification at TA-78. Therefore, there is IC101 as a amplifier in EBP-78. Signals are amplified there, and drive the speakers.

See page 7 - 10 on connection and signal path of the each case by AC-78, EBP-78.

CONNECTION BETWEEN EACH SET AND SIGNAL PATH

The Case of Power Supply by AC-78

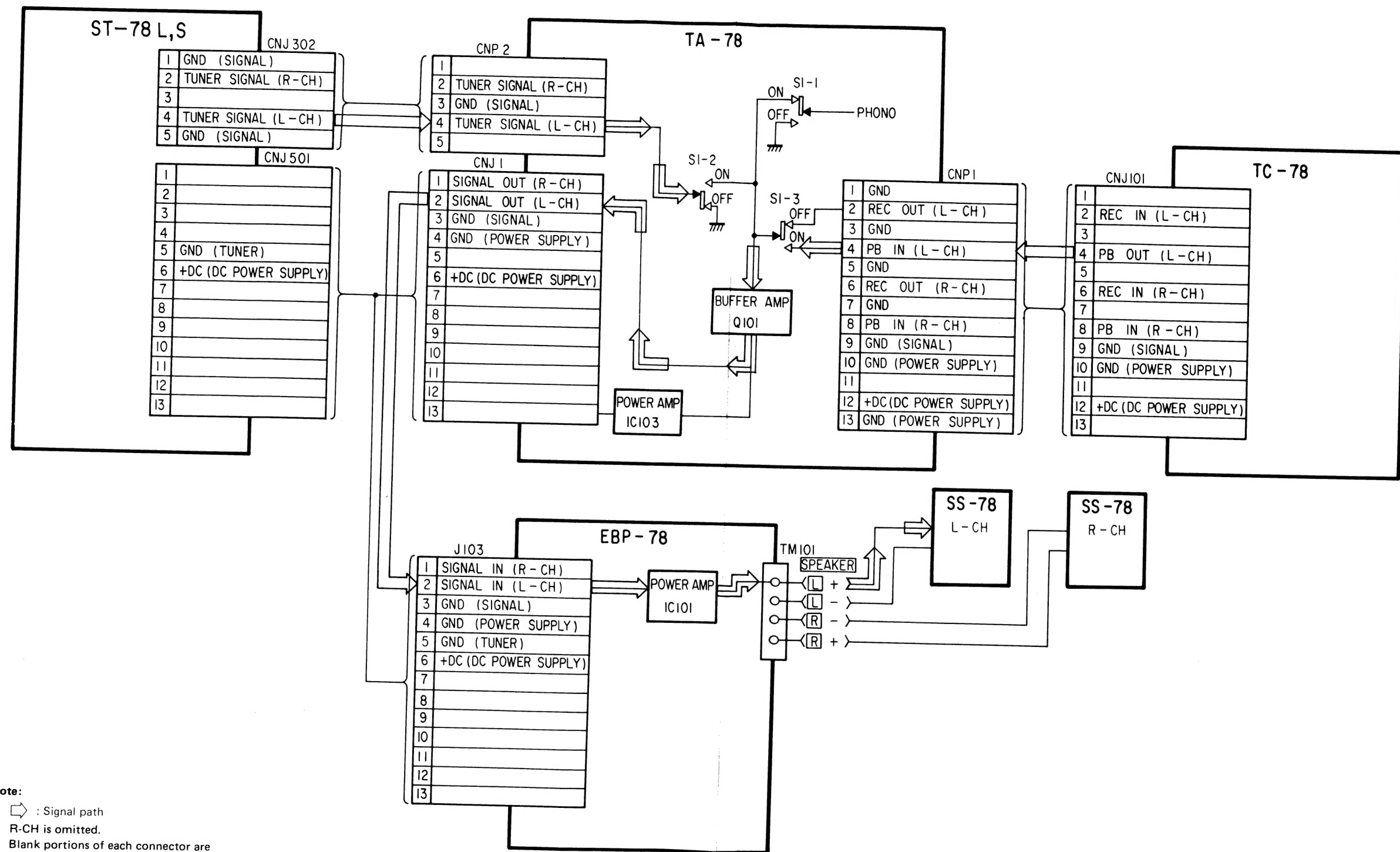


Note:

- : Signal path
- R-CH is omitted.
- Blank portions of each connector are not used in the set, and/or not connected inside of the set.

CONNECTION BETWEEN EACH SET AND SIGNAL PATH

The Case of Power Supply by EBP-78 (optional accessory)



Note:

- : Signal path
- R-CH is omitted.
- Blank portions of each connector are not used in the set, and/or not connected inside of the set.

SPECIFICATIONS

ST-78S/78L

System FM stereo, FM/AM superheterodyne tuner
Quartz-locked digital synthesizer system

General

Dimensions Approx. 215 × 55 × 240 mm (w/h/d)
(8½ × 2¼ × 9½ inches)
incl. projecting parts and controls

Weight Approx. 1.1 kg (2 lbs. 7 oz) net

FM tuner section

Tuning range 87.5-108 MHz
Antenna terminals 75 ohm unbalanced
Intermediate frequency 10.7 MHz
Usable sensitivity 2.3 µV, S/N = 30 dB/75 ohm
Signal-to-noise ratio 78 dB (mono), 70 dB (stereo)
Harmonic distortion 0.2% (mono), 0.5% (stereo) at 1 KHz
Separation Better than 40 dB at 1 kHz
Selectivity 55 dB (400 kHz)

MW/LW tuner section (for ST-78L) AEP, UK model

		MW	LW
Tuning range		522—1,602 kHz	153—344 kHz
Antenna		Built-in ferrite bar antenna, External antenna terminal	
Intermediate frequency		450 kHz	450 kHz
Usable sensitivity	built-in antenna	250 µV/m (1,000 kHz)	500 µV/m (230 kHz)
	external antenna	100 µV (1,000 kHz)	150 µV (230 kHz)
Signal-to-noise ratio (50 mV/m)		52 dB	52 dB
Harmonic distortion (50 mV/m, 400 Hz)		0.3%	0.3%
Selectivity		30 dB (9 kHz)	40 dB (9 kHz)

SW/MW tuner section (for ST-78S) E model

		SW 1	SW 2	MW
Tuning range		3.2 – 7.3 MHz	9.5 – 21.75 MHz	522 – 1,602 kHz (at 9 kHz step) 530 – 1,610 kHz (at 10 kHz step)
Antenna		External antenna terminal		Built-in ferrite bar antenna, External antenna terminal
Intermediate frequency		450 kHz		450 kHz
Usable sensitivity	built-in antenna	—	—	250 µV/m (1,000 kHz)
	external antenna	23 µV (5 MHz)	30 µV (15 MHz)	100 µV (1,000 kHz)
Signal-to-noise ratio		50 dB (5 mV)		52 dB (50 mV/m)
Harmonic distortion		0.3% (5 mV, 400 Hz)		0.3% (50 mV/m, 400 Hz)
Selectivity		30 dB (9 kHz)		30 dB (9 kHz)

TC-78

Recording system 4-track 2-channel stereo
Frequency response DOLBY NR OFF (DIN)
With TYPE IV cassette (Sony METALLIC cassette)
30 – 16,000 Hz (±3 dB)
With TYPE III cassette (Sony FeCr cassette)
30 – 16,000 Hz (±3 dB)
With TYPE II cassette (Sony CD-a cassette)
30 – 15,000 Hz (±3 dB)
With TYPE I cassette (Sony BHF cassette)
30 – 14,000 Hz (±3 dB)

Wow and flutter 0.07% WRMS (NAB)
±0.2% (DIN)

General

Dimensions Approx. 215 × 103 × 235 mm (w/h/d)
(8½ × 4¼ × 9½ inches)
incl. projecting parts and controls

Weight Approx. 3.5 kg (7 lbs 12 oz) net

TA-78

Continuous RMS power output (AEP, UK model)

38 + 38 watts
(6 ohms, at 1 kHz) 5%
30 + 30 watts
(6 ohms, at 1 kHz) 0.5%
24 + 24 watts
(6 ohms, 40 Hz – 20 kHz) 0.5%

Music power (E model)

120 watts (6 ohms)

Inputs

	Sensitivity	Impedance
PHONO (phono jacks)	2.5 mV	50 kilohms
CD/AUX (phone jack)	150 mV	50 kilohms

Frequency response PHONO: RIAA curve ± 0.5 dB
CD/AUX: 15 Hz – 60 kHz ± 0.5 dB

General

Dimensions Approx. 215 × 55 × 240 mm (w/h/d)
(8½ × 2¼ × 9½ inches)
incl. projecting parts and controls

Weight Approx. 1.2 kg (2 lbs 11 oz) net

— Continued — →

AC-78

Power requirements	AEP, UK model: Operates on 220 V or 240 V ac E model: Operates on 120, 220 or 240 V ac
Outputs	
HEADPHONES	Accepts headphones of 8 ohms or more
SPEAKER	Accepts speakers of 6 to 16 ohms
General	
Dimensions	Approx. 215 × 55 × 235 mm (w/h/d) (8½ × 2¼ × 9¾ inches) incl. projecting parts and controls
Weight	Approx. 3.5 kg (7 lbs 12 oz) net

SS-78

Speaker system	2 way speaker system Woofer: 10 cm Tweeter: 5 cm
Power handling capacity	Music 60 watts Nominal 30 watts
Frequency range	80 Hz - 20 kHz
Sensitivity	90 dB/W/m
Impedance	6 ohms
General	
Dimensions	Approx. 160 × 260 × 230 mm (w/h/d) (6⅜ × 10¼ × 9⅛ inches)
Weight	Approx. 2.7 kg (6 lbs) net per unit

General

Power consumption	AEP, E model: 65 watts UK model: 220 watts
Dimensions	Approx. 535 × 320 × 240 mm(w/h/d) (21⅞ × 12⅝ × 9½ inches) incl. projecting parts and controls
Weight	Approx. 15.1 kg (33 lbs 5 oz) net Approx. 16.5 kg (36 lbs 7 oz) in shipping carton

Caution on UK model

Important

The wires in the mains lead are coloured in accordance with the following code:

Blue: Neutral
Brown: Live

As the colours of the wires in the mains lead of this apparatus may not correspond with the coloured markings identifying the terminals in your plug proceed as follows:

The wire which is coloured blue must be connected to the terminal which is marked with the letter N or coloured black.

The wire which is coloured brown must be connected to the terminal which is marked with the letter L or coloured red.

FEATURES

The Sony FH-7 is a compact high-density component system consisting of an FM stereo/FM-AM tuner, a high quality cassette deck, and integrated amplifier. You can take it anywhere so that you can enjoy a variety of program sources--broadcast programs, taped programs, etc., anytime you like.

The FH-7's matched components are the equal of fine separate components and have the following features:

- Three different power sources: house current using supplied AC power supply unit, batteries and 12 V car battery using the optional DC power supply unit (EBP-78).
- Newly developed flat connecting cords which enable you to connect each component quickly and easily.
- The connectable carrying handle makes the FH-7 carryable as a small suit case.

Amplifier section

- CD/AUX jack for duplicating a tape with an external tape recorder and phono input jacks for listening to records.
- Five frequency band equalizer to compose the source sound to your liking.

Tuner section

- The quartz-locked digital synthesizer system with a sophisticated Phase Locked Loop (PLL) circuit allows extremely precise tuning of FM and MW/LW or SW stations with an electronic digital readout on the frequency display.
- Built-in telescopic antenna and external antenna terminals.
- The PLL (Phase Locked Loop) multiplex circuit assures stable FM reception

Cassette deck section

- The cassette deck can use the metal tapes, providing wider dynamic range and extended frequency response.
- Auto-reverse function for changing the tape direction automatically in the playback mode. You don't have to turn the cassette over to play the other side.
- Automatic Music Sensor (AMS) allows easy playback of the selection being played and easy skipping to the next selection.
- The new automatic recording system sets the recording level automatically.
- The record muting function allows you to eliminate material you do not want to record, such as commercials, and to make a blank space between selections.
- The Dolby NR (noise reduction) system reduces tape hiss and assures high quality recording and playback.

AC power supply section

- Permits headphones to be connected. Their volume is adjustable.
- This section supplies power to the tuner, amplifier and tape deck.

MODEL IDENTIFICATIONS

(TA-78 & SS-78 have no differences by the model.)

- This label is sticked on TC-78.

ST-78L ... AEP, UK Model
ST-78S ... E Model

SONY®
MODEL NO. FH-7
COMPACT HI-DENSITY COMPONENT SYSTEM

[] : FM STEREO/FM-AM TUNER

TA-78 : INTEGRATED STEREO AMPLIFIER

TC-78 : STEREO CASSETTE DECK

AC-78 : POWER SUPPLY UNIT

SS-78 : SPEAKER SYSTEM

SERIAL NO.

MADE IN JAPAN

ST-78L

SONY®
MODEL NO. ST-78L
FM STEREO/FM-AM TUNER
COMPACT HI-DENSITY COMPONENT SYSTEM FH-7

FREQUENCY RANGE: FM: 87.5 – 108MHz

MW: 522 – 1602kHz LW: 153 – 344kHz

IF FM; 10.7MHz AM; 450kHz

SERIAL NO.

MADE IN JAPAN

{ BLANK ... AEP, UK Model

{ FTZ-PRÜFNUMMER U185 ... For WEST GERMANY

AC-78

SONY®
MODEL NO. AC-78
POWER SUPPLY UNIT
COMPACT HI-DENSITY COMPONENT SYSTEM FH-7

[]



SERIAL NO.

MADE IN JAPAN

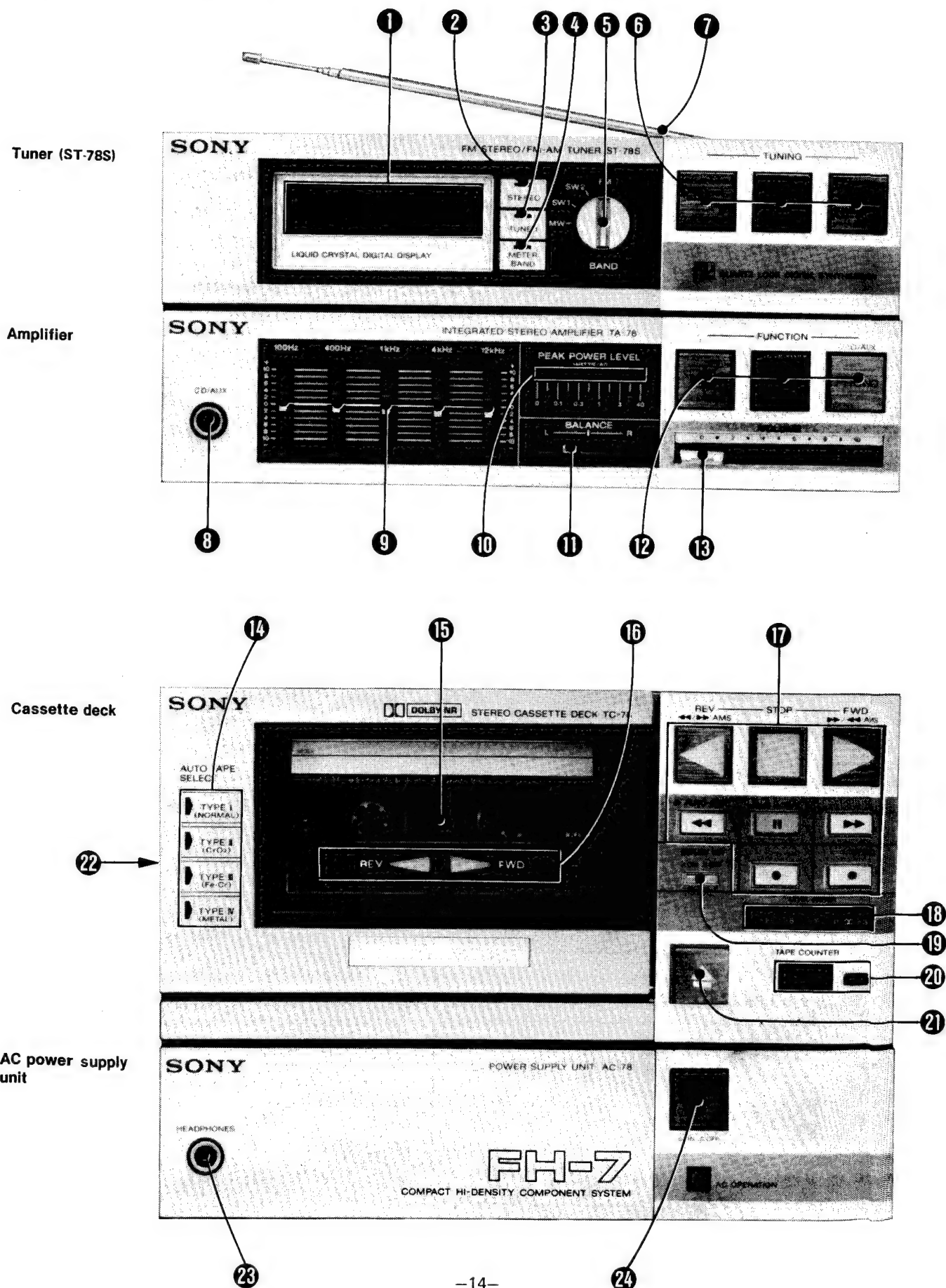
{ AC . 220/240V ~ 50/60Hz 65W ... AEP Model

{ AC . 220/240V ~ 50/60Hz 220W ... UK Model

{ AC : 120/220/240V ~ 50/60Hz 65W ... E Model

SECTION 1 OUTLINE

FUNCTION OF CONTROLS



Tuner ST-78L/78S

(The photo shows the ST-78S tuner.)

① Frequency display

Permits reading the received frequency at a glance from the figures.

② STEREO indicator

This indicator will light when an FM stereo program of sufficient signal strength is tuned in.

③ TUNED indicator

Lights up when a signal is tuned in accurately.

④ METER BAND indicator (for ST-78S)

Lights up to show the receiving frequency is in an SW meter band.

⑤ BAND selector

Selects the desired band.

ST-78L: FM, MW or LW.

ST-78S: FM, MW, SW1 or SW2.

⑥ TUNING buttons

Press either the "+" or "-" button to change the frequency.

Press the "-" button to go to a lower frequency and the "+" button to go to a higher. To change the frequency rapidly, press the "FAST" button while pressing "+" or "-" button.

⑦ Telescopic antenna

Used for FM or SW (only for ST-78S) reception.

Amplifier TA-78
⑧ CD/AUX jack

This stereo phone jack allows you to quickly and easily connect a tape recorder for playback. Press PHONO switch of the FUNCTION selectors.

⑨ Graphic equalizer controls

Slide downwards or upwards to equalize the reproduced sound (TAPE, PHONO or TUNER).

⑩ PEAK POWER LEVEL meters

These meters show the output level of the power amplifier.

⑪ BALANCE control lever

This controls the balance of the left and right channel output level. Normally set the control to the center position.

⑫ FUNCTION selectors

Press the desired program source among tape, tuner, record player or the signal from the CD/AUX jack.

PHONO: For disc programs connected to PHONO inputs or the auxiliary programs connected to the CD/AUX jack. Disconnect the phone plug connected to the CD/AUX jack when reproducing disc programs.

TUNER: For off-the-air programs.

TAPE: For taped programs.

⑬ VOLUME control

This controls the overall output level.

Cassette deck TC-78
⑭ Tape type indicators

The type of the tape being used is automatically detected by the automatic tape selector system and the corresponding indicator lights.

⑮ Cassette holder
⑯ Tape direction indicators

During playback or recording, one of the indicators illuminates to show the direction of the tape transport.

⑰ Function buttons

It is possible to switch directly from one mode to another.

► (forward) button: Press this button to play the tape back the front side of the cassette. The tape is transported to the right.

►► (fast-forward) button: Press this button to advance the tape rapidly to the right.

● (record) button: Press this button together with the ► button to start recording. The indicator will illuminate.

■ (stop) button: To stop the tape, press this button.

⏸ (pause) button: Press this button to stop the tape for a moment during recording and play back of the front side of the cassette. To restart, press the button again. This button is also used to release the record mode. (This button does not operate during the reverse mode).

○ (record muting) button: Press this button to eliminate unwanted material and to insert a blank space during recording.

◀ (reverse) button: Press this button to play the back side of the cassette.

◀◀ (fast-reverse) button: Press this button to advance the tape rapidly to the left.

⑱ LEVEL METER

These meters show the input level during recording and recorded levels during playback.

⑲ DOLBY NR switch

To record with the Dolby NR* (Noise Reduction) process, depress this switch. To record without the Dolby NR process, press again and release this switch.

When playing back, set this switch to the same position used in recording.

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⑳ TAPE COUNTER and reset button

The tape counter provides a numerical reference point while recording which can be used to index a recorded cassette. To reset to zero, press the reset button.

㉑ (eject) button

Press this button to open the cassette holder.

㉒ ISS (Interference suppress switch) (on the rear)

If interference is encountered while recording, MW or LW program, slide the switch to 2 or 3 position depending on which best reduces the noise. Normally set the switch to 1 position.

AC power supply unit AC-78
㉓ HEADPHONES jack

Accepts any headphones. The headphone volume can be adjusted with the volume control.

㉔ POWER switch

Press to turn on the powers of amplifier, tuner and cassette deck. To turn them off, press it again.

POWER CABLE AND SIGNAL CABLE CONNECTION

Notes

- The connector covers are connected to the male connectors at the factory to protect the connector. Remove the connector covers before connecting the flat cables.
- Turn the POWER switch off when connecting or disconnecting the connector to avoid damaging the speaker.
- Be sure to insert the female connector firmly until it clicks into the male connector. Loose connections may cause hum and noise.

See illust **D**.

To disconnect the cable

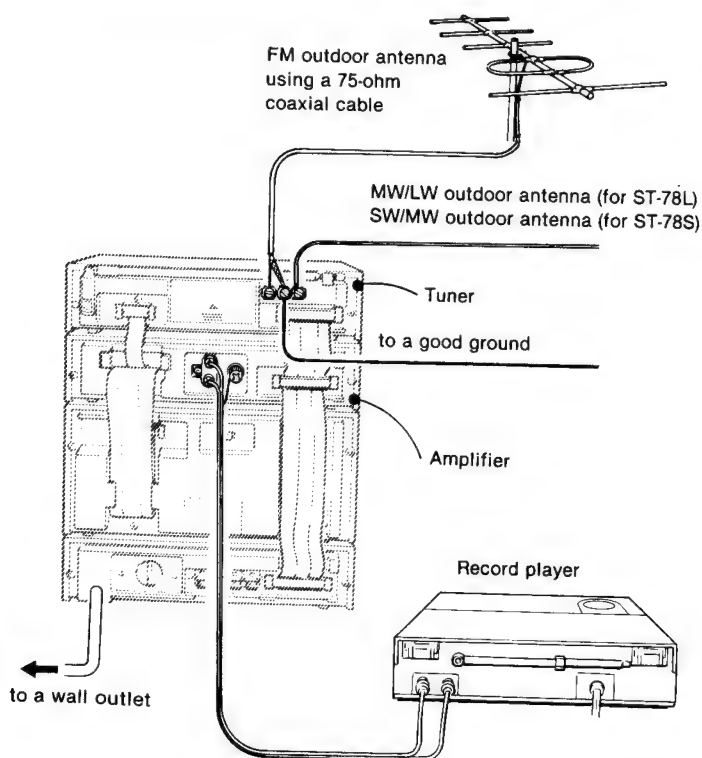
To disconnect the cable, pull the connector out. Never pull the cable itself.

See illust **E**.

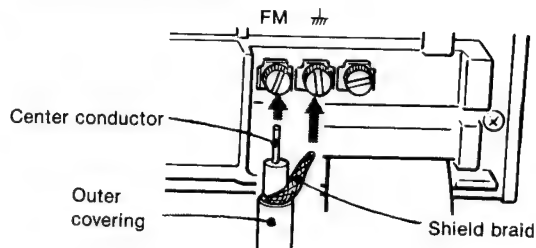
Do not connect the cable this way.

See illust **F**.

OUTDOOR ANTENNA AND PHONO JACKS CONNECTION



75 ohm coaxial cable connection



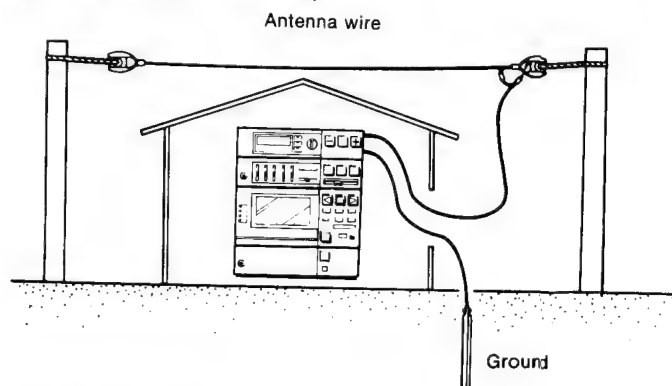
The tuner accepts 75 ohm coaxial cable. It is free from external interference, reduces noise pickup, and is the ideal transmission line for most FM installations.

MW and LW antenna connection (LW for the ST-78L)

In most areas, the built-in ferrite-bar antenna will provide satisfactory reception. In difficult reception areas, it may be necessary to connect a length of insulated wire 5 - 15 meters (20 - 50 feet) long to the MW/LW ANTENNA terminal (for the ST-78L) or SW/MW ANTENNA terminal (for the ST-78S). Extend this out of doors if possible, keeping the greater portion horizontal.

SW antenna connection (for the ST-78S)

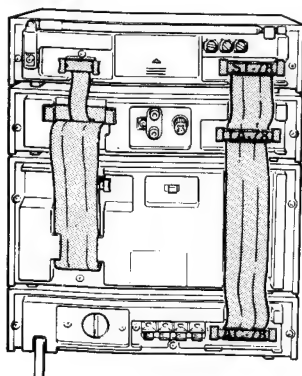
The built-in telescopic antenna will provide satisfactory reception. In difficult reception areas, it may be necessary to connect the SW antenna wire AN-60 to the SW/MW ANTENNA terminal and extend it as high as possible keeping from touching other material or trees. Keep the wire far away from high voltage transmission lines and noisy electrical machinery.



Ground connection

When an outdoor antenna is installed, a direct ground is recommended for lightning protection. The use of a lightning arrestor is recommended for any outdoor antenna.

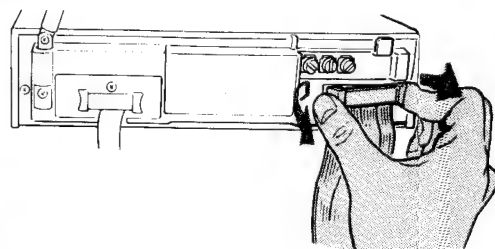
D



F

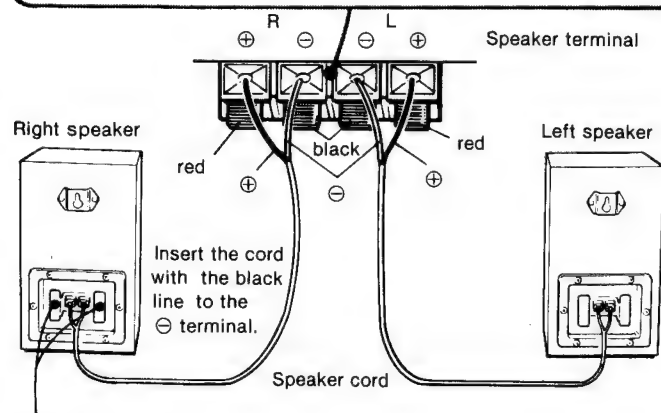
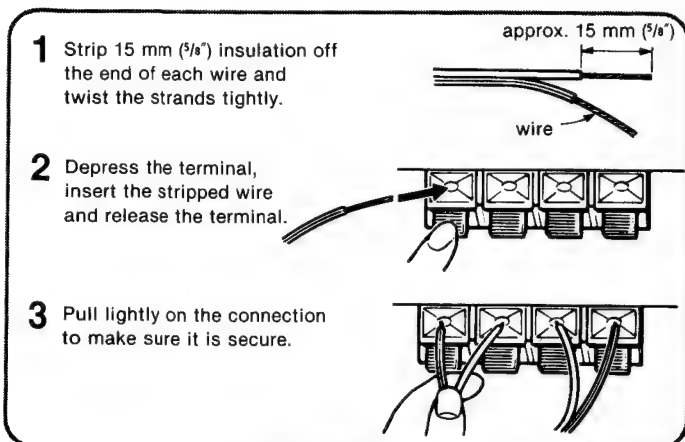


E



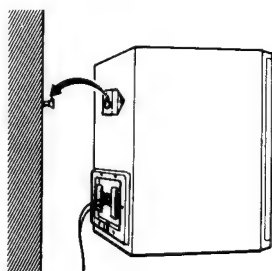
SPEAKER SYSTEM CONNECTION

Connect the supplied speaker cords to the input terminals of the speaker and the speaker terminals of the AC power supply unit, i.e., the right speaker to the R terminals and the left speaker to the L terminals, with correct speaker phasing (correct \oplus and \ominus connections).



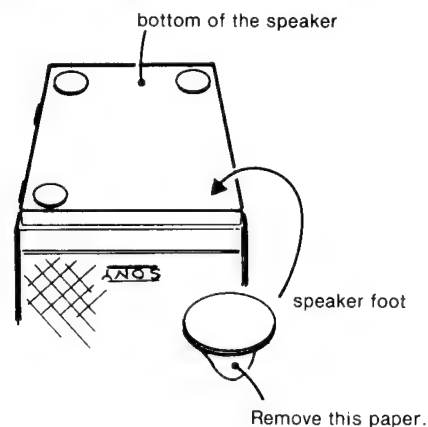
To shorten the speaker cord, wind the excessive cord on these hooks.

To hang on a wall



Note on the supplied feet for the speaker

Attach the supplied feet for the speaker on the bottom of the speaker to prevent the speaker from damage.



ON BATTERY

To retain the frequency received on each band while the tuner is turned off, install two batteries in the battery compartment at the rear of the tuner.

INSTALLATION

Be sure to turn off the POWER switch before installing the batteries.

Open the battery compartment lid, install two batteries, IEC designation R6 (size AA), with the correct polarity as illustrated, then close the lid.

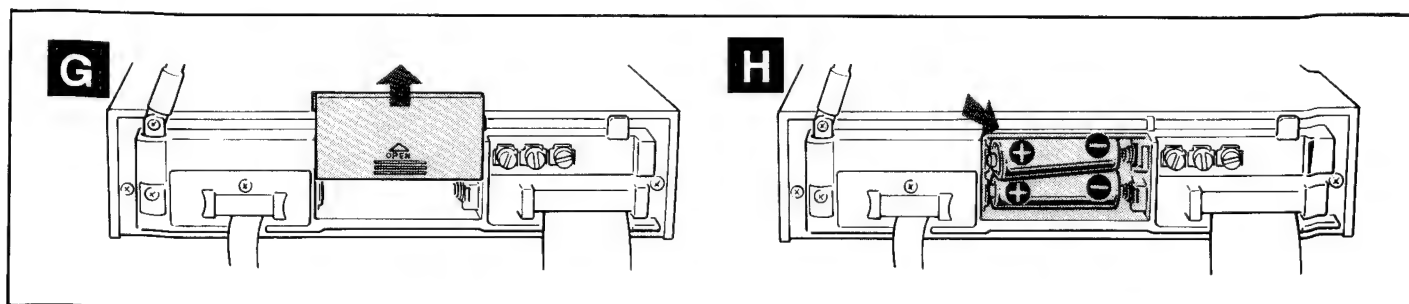
See illust **G**, **H**.

Battery life

About one year of operation can be expected when using Sony SUM-3 (NS) New Super Batteries. Be sure to replace the batteries once a year to avoid damage from leaking batteries.

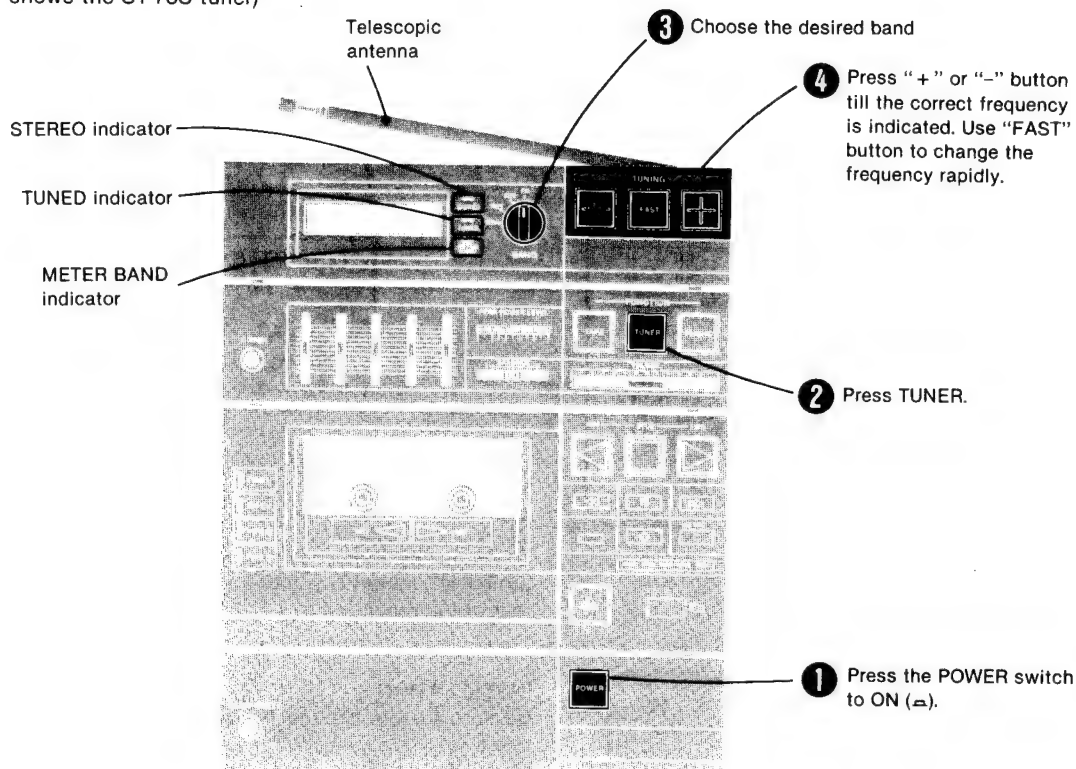
Note

If incorrect figures appear on the frequency display after turning on the POWER switch, turn off the POWER switch, take out and re-install the memory back-up batteries correctly and tune in the frequency.



OPERATION OF THE TUNER

Follow the numbered sequence.
(The illustration shows the ST-78S tuner)



During the tuning, when the frequency access to the station, the searching speed will slow down so that the tuning gets easier. However, when the FAST button is pressed during tuning, the searching speed will not slow down.

- STEREO indicator illuminates when an FM stereo program is received.
- TUNED indicator illuminates when a station is tuned in.
- METER BAND indicator (for ST-78S) illuminates to show the receiving frequency is in an SW meter band.

Adjust the antenna as required.

FM: Pull out the telescopic antenna and adjust its length, direction and angle for the best reception.

SW (for ST-78S): Pull out the telescopic antenna to its full length and stand it vertically.

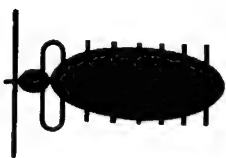
MW/LW (LW for ST-78L): When the BAND selector is set to MW or LW, the built-in ferrite bar antenna is used instead. Since this antenna is directional, rotate the set horizontally for optimum reception, if necessary.

MORE ABOUT FM ANTENNAS

Good FM reception depends not only on tuner sensitivity but on the quality of the received signals. This is determined by the signal strength, the presence of multipath signals* and the geographic location of the FM station. To get the best from your tuner, use an antenna suited to your location.



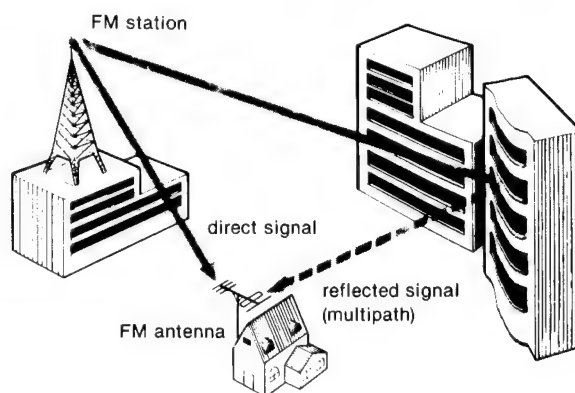
Dipole antenna with reflector and director has increased sensitivity to front signal and reduced sensitivity to rear signals.



Multi-element type has a narrower pickup pattern with high frontal sensitivity and superior rejection of rear and multipath signals. To receive a distant or weak signal station, use this type of antenna.

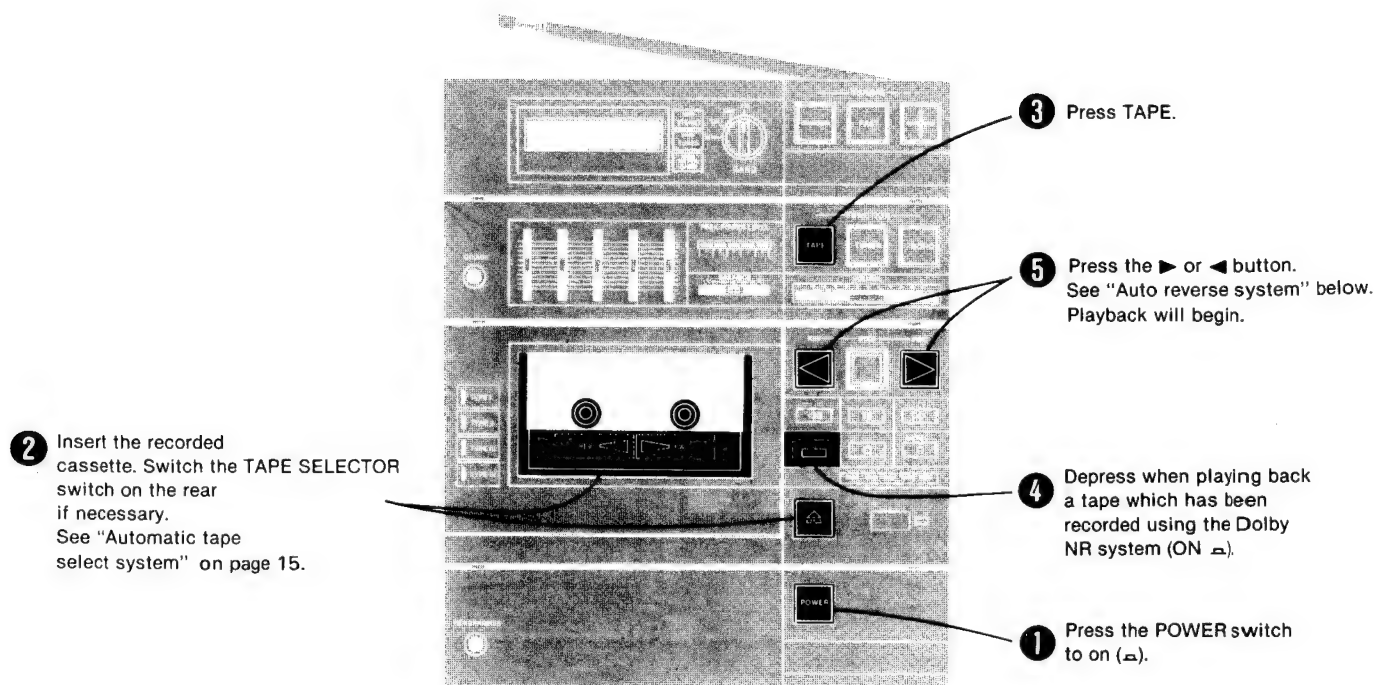
* Multipath signals

Multipath interference is caused by signal reflections from hills or structures that reach the receiving antenna perceptibly later than a direct signal. The effects of a multipath condition appear as high-frequency noise, distortion, and loss of channel separation of the FM stereo programs. These effects may be eliminated, to a great extent, by using a coaxial lead-in and a good directional antenna that is correctly oriented.



TAPE PLAYBACK

Follow the numbered sequence.



Auto reverse system

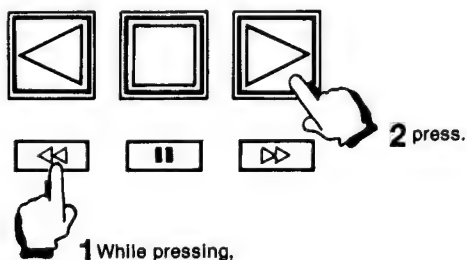
Press the ► button to play back the front side of the cassette. The playback will be in the reversed side automatically after the tape end of the playback of the front side.

Press the ◀ button to play back the back side of the cassette. The tape will stop when the back side is completely played back.

AUTO PLAY

To rewind the tape and play from the beginning of the tape, use the auto play function. The cassette deck can automatically replay a tape immediately after rewinding.

● Auto play operates only on the playback of the front side of the cassette.



After the tape is completely rewound, the tape will automatically replay.

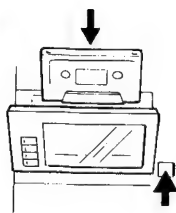
TAPE RECORDING

It is only possible to record the front side of the cassette.

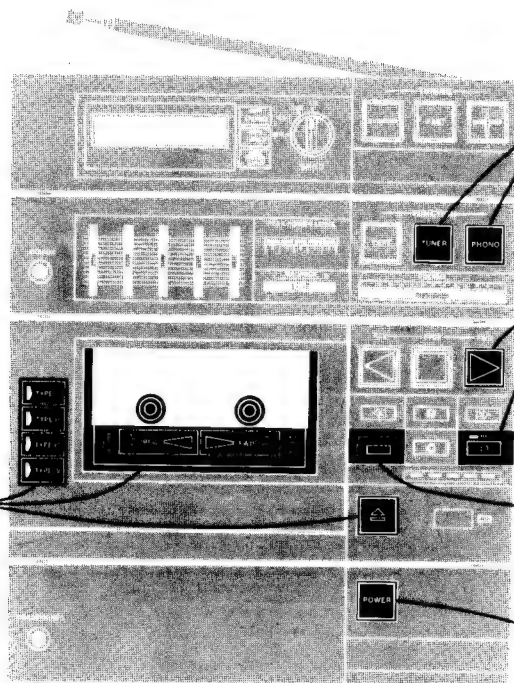
TO RECORD

Follow the numbered sequence.

2



Insert a cassette with the tape surface downwards. Switch the TAPE SELECTOR switch on the rear if necessary. See "Automatic tape select system" on page 15.



3

Select the desired program source and play the program.

5

Press the ► and ● buttons at the same time. Recording will begin.

4

Depress when recording using the Dolby NR system (▲ ON).

1

Press the POWER switch to ON (▲).

AUTOMATIC RECORDING SYSTEM

No recording level adjustment is necessary with the new automatic recording system.

The recording level is not affected by the volume, BALANCE or graphic equalizer controls, so you can listen to the program at any volume and with any tone adjustments you want while recording.

MORE ACCURATE RECORDING STARTS

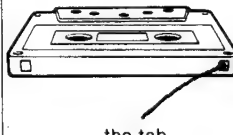
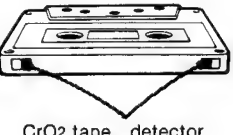
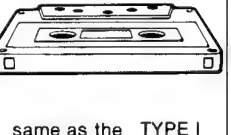
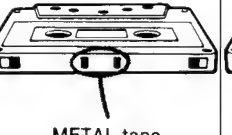
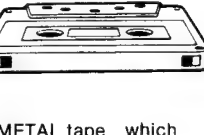





You can use the || (pause) button to start recording more accurately than is possible when recording is started by pressing both the ● button and the ► button.

1 After completing step 1, press the || button.

2 Hold the ● button down and press the ► button.

3 At the moment you wish to start recording, you need only press the || button again.

AUTOMATIC TAPE SELECT SYSTEM

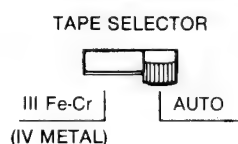
	TYPE I (NORMAL) cassette	TYPE II (CrO ₂) cassette	TYPE III (Fe-Cr) cassette	TYPE IV (METAL) cassette	
Tape detector slots	 the tab	 CrO ₂ tape detector slots	 same as the TYPE I cassette	 METAL tape detector slots	 METAL tape which has no METAL tape detector slots
TAPE indicator	 TYPE I (NORMAL)	 TYPE II (CrO ₂)	 TYPE I (NORMAL)	 TYPE IV (METAL)	 TYPE II (CrO ₂)

With the TAPE SELECTOR switch at the AUTO position, this automatic tape select system is actuated by the detector slots of certain cassettes and automatically sets the optimum recording and playback characteristics.

The tape type detected will be shown by the indicator.

As shown in the above illustrations, when inserting TYPE III (Fe-Cr) cassettes and TYPE IV (METAL) cassettes which have no METAL tape detector slots, the correct TAPE indicator does not light up and the automatic tape select system cannot work properly.


Set the TAPE SELECTOR switch at the rear to the III Fe-Cr (IV METAL) position when using these cassettes.






Tape list

Tapes (C-60 and C-90)		Type of tape
SONY : AHF, BHF, CHF BASF : LH-X, Professional I MAXELL : UD, UD-XL I, XL I-S SCOTCH : MASTER I	AGFA : SUPER FERRO DYNAMIC FUJI : FX-I PHILIPS : SUPER FERRO-I TDK : AD	TYPE I (NORMAL)
SONY : UCX-S, CD-α BASF : Professional II MAXELL : UD-XLII, XLII-S SCOTCH : MASTER II	AGFA : STEREO CHROM FUJI : FX-II PHILIPS : CHROMIUM TDK : SA, SA-X	TYPE II (CrO ₂)
SONY : FeCr BASF : Professional III SCOTCH : MASTER III	AGFA : CARAT PHILIPS : FERRO CHROMIUM	TYPE III (Fe-Cr)
SONY : METALLIC	Other metal tapes	TYPE IV (METAL)





RECORD MUTING

By pressing the  (record muting) button during recording, four seconds interspacing is provided automatically, eliminating unwanted program material such as broadcasting commercials. While the record muting is operating, the incoming signal is not recorded on the tape but it continues to register on the meters and feed to the monitor so that you know exactly what is going on.

① Press the  button when the segment you do not want to record begins. The indicator of the  button will blink, and the tape path will pause automatically after four seconds.

② When you want to resume recording, press the  button.

To insert a blank over four seconds long

Hold down the  button for as long as you want the blank segment on the tape to be. After four seconds, the indicator of the  button will blink more rapidly. When you release the  button, the tape deck will be in the pause mode. When you want to resume recording, press the  button to release the pause mode.

ERASING

When the cassette deck functions in recording mode, the erase head automatically erases any previously recorded material.

To erase without recording :

① Make sure that the safety tab of the cassette is in place, or that the tab slot is covered with plastic tape.

② Insert the cassette to be erased and check that the tape type indicator corresponds to the type of tape inserted. Switch the TAPE SELECTOR switch if the indicator and the tape do not correspond.

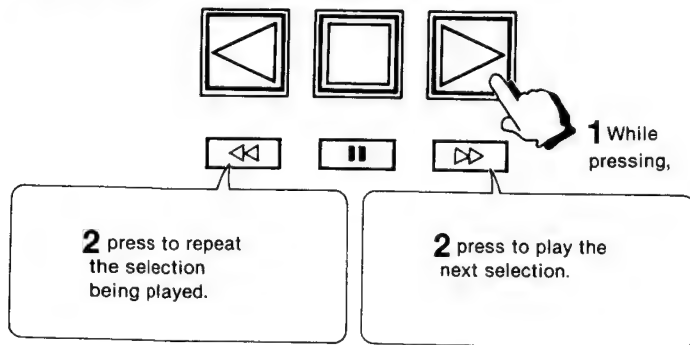
③ Press the TAPE button of the FUNCTION selector.

④ While holding the  button down, press the  button.

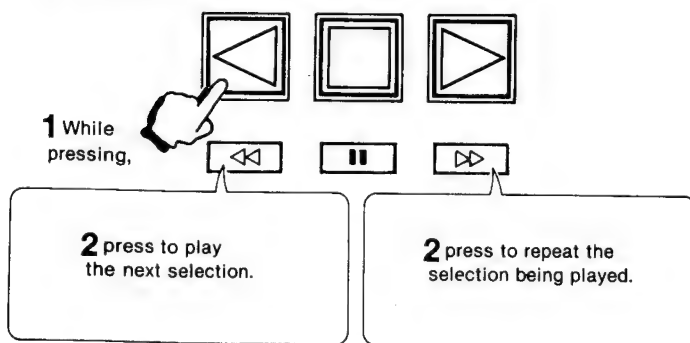
AUTOMATIC MUSIC SENSOR (AMS) SYSTEM

During playback, use the Automatic Music Sensor (AMS) to locate the beginning of the selection being played or the following selection. The AMS searches for the blank space between selections, and playback will start automatically from the beginning of the selection.

During forward playback



During reverse playback



At the beginning of the selection, the ◀◀ or ▶▶ button will be released and playback will begin.

To assure the AMS operation

- To search for the beginning of the selection being played, wait about 15 seconds after the selection starts before pressing the ◀◀ or ▶▶ button; otherwise the previous selection will be played back.

- To search for the beginning of the following selection, do not press the ▶▶ button immediately before the starting point of the following selection; otherwise playback might begin from the beginning of the selection after the following one.

Notes on the blank spaces

- Since AMS works by searching out the blank spaces on a tape, it may not operate if there is noise in the space between selections, or if the space is less than 4 seconds long.

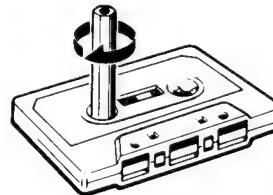
The record muting facility of this tape deck can make a four second blank space that will assure AMS operation on any recorded tape.

- If the record music includes a long pause, or if it continues for a time at sufficiently low volume, as may happen for instance with classical music, or if any selection is less than 20 seconds long, the AMS will treat it as a blank.

NOTES ON CASSETTES

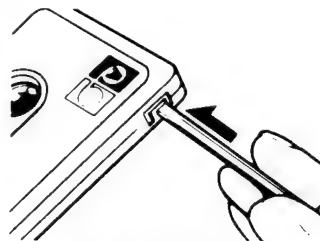
Cassette insertion

- Before inserting a cassette, take up any slack in the tape to prevent it from becoming tangled around the capstan.

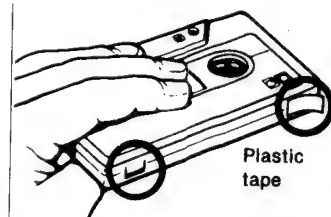


To protect cassettes from accidental erasure

Remove the tab as illustrated so that the record mode does not function when the record button is pressed. To record on a cassette once tabs have been removed, simply cover the slot with plastic tape.

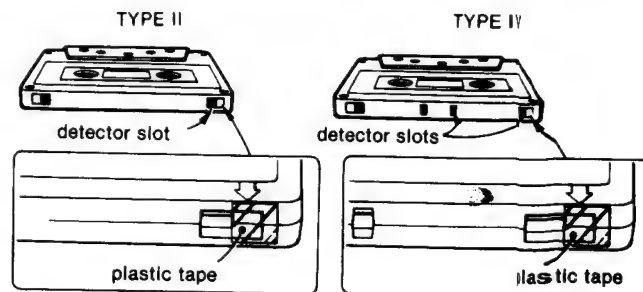


To protect side A recording



Do not stick any material on the cassette except for tape on the circled portions.

- Be careful not to cover the detector slots of the TYPE II (CrO₂ tape) and TYPE IV (metal tape) cassettes.



Cassette care

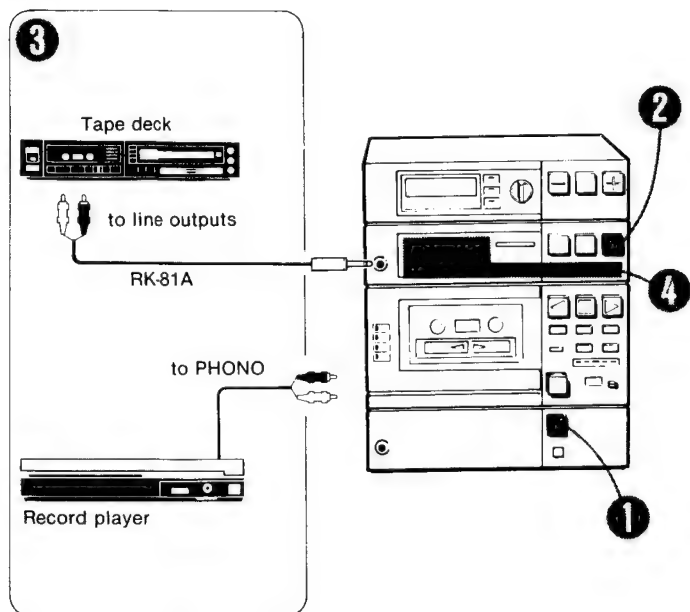
- Do not stick thick paper or tape onto the cassette, as this may affect proper cassette alignment and prevent proper tape contact with the head.

- Keep cassettes away from magnetic equipment such as speakers, amplifiers, etc., as erasure or distortion on your recorded tape could occur.

- Do not expose a cassette to direct sunlight, extremely cold temperatures or moisture.

REPRODUCTION OF PHONO OR CD/AUX PROGRAM SOURCES

You can listen to or record the disc program connected to the PHONO jacks or the auxiliary input sources such as another tape deck or compact disc player connected to the CD/AUX jack using Sony RK-81A connecting cord (optional).



- ① Press the POWER switch.
- ② Press the PHONO button of the FUNCTION selectors.
- ③ Play the program source.
- ④ Adjust the volume, equalizer controls and stereo balance.

The CD/AUX jack has priority over the PHONO jacks. If the CD/AUX jack and PHONO jacks are both connected and the PHONO button is depressed, you cannot listen to the record programs.

SOUND ADJUSTMENTS

STEREO BALANCE

Adjust the BALANCE control as necessary to produce a well defined stereo image.

TONE CONTROLS USING THE GRAPHIC EQUALIZER CONTROLS

Each graphic equalizer control has boost/cut range of 10 dB. The level of a band will be increased by sliding a control upwards, and decreased by sliding it downwards.

To equalize the sound, first set all equalizer controls at their 0 dB center position and lay the program. Slide the control of the frequency band to be equalized upwards or downwards until you perceive an improvement.

Frequency coverage of each equalizer control

100 Hz: Use this control to boost or cut the bass.

400 Hz: Use this control to adjust the middle frequency range—the human voice and the middle frequencies of instrumental music.

1 kHz: Use this control to provide more presence to vocals.

4 kHz: Use this control to adjust the brightness of sound.

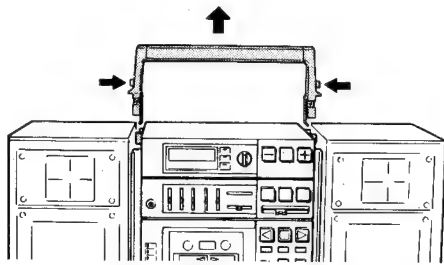
12 kHz: This control effects general treble. Slide downward to reduce high frequency noise, such as tape hiss.

SECTION 2 DISASSEMBLY

REMOVAL

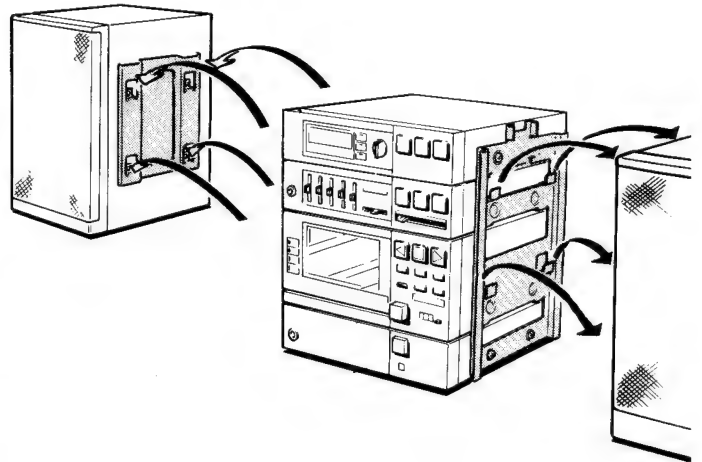
HANDLE

Pull out handle by pushing the button of both sides.

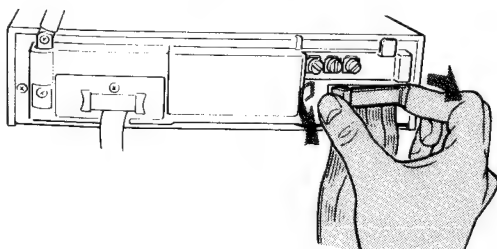
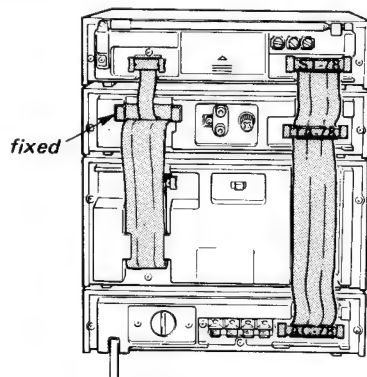


SPEAKERS

Remove speakers.

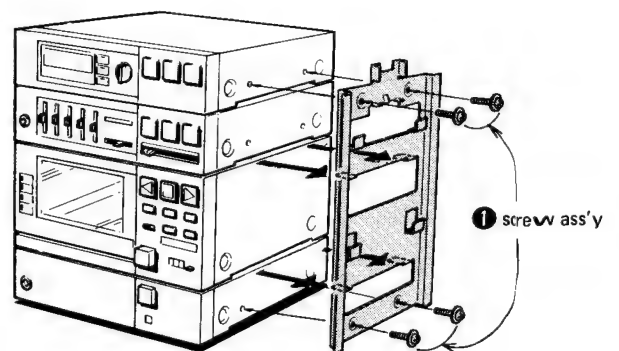


CONNECTORS



Remove connectors.

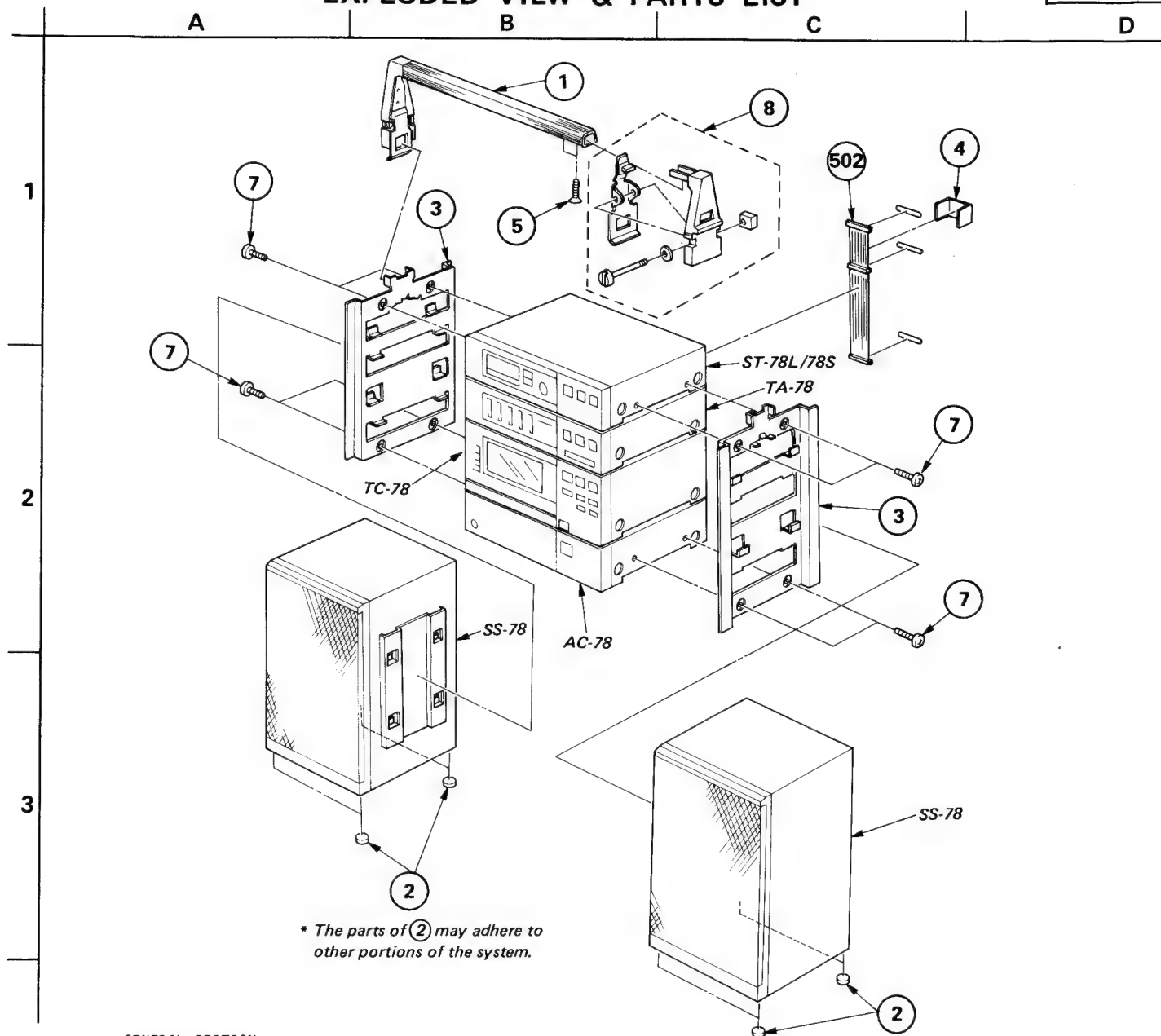
SIDE PLATE



② Pull out both side plates.

SECTION 3 EXPLODED VIEW & PARTS LIST

FH-7



GENERAL SECTION

No.	Part No.	Description
1	2-249-402-11	HANDLE
2	4-883-915-00	FOOT
3	4-884-807-00	PLATE (A), SIDE
4	4-884-875-00	LABEL (A) (CONNECTOR), CAUTION
5	7-682-248-09	SCREW +K 3X8
6	.....
7	X-4884-807-0	SCREW ASSY, SIDE PLATE
8	X-4884-813-1	HANDLE ASSY

ACCESSORY & PACKING MATERIAL

Part No.	Description
3-701-613-00	BAG, POLYETHYLENE
3-701-630-00	BAG, POLYETHYLENE
3-773-106-11	(ENGLISH,FRENCH,SPANISH,ITALY) .....MANUAL, INSTRUCTION
3-773-106-41	(AEP/GERMAN,DUTCH,SWEDISH) .....MANUAL, INSTRUCTION
3-773-106-51	(FOR GERMANY/ENGLISH,FRENCH,GERMAN) ....MANUAL INSTRUCTION

Part No.	Description
3-793-828-11	QUESTIONNAIRE
3-795-491-11	(E2)...INSTRUCTION
4-884-884-00	SHEET, PROTECTION
4-884-885-00	SHEET, PROTECTION
4-884-886-00	CUSHION (REAR), UPPER
4-884-887-00	INDIVIDUAL CARTON
4-884-888-00	CUSHION (FRONT), UPPER
4-884-889-00	BOX, ACCESSORY
4-884-890-00	CUSHION (LOWER)
4-884-945-00	PARTITION
♣;4-884-957-00	PROTECTOR
X-3701-105-0	ROD ASSY, CLEANING, HEAD

ELECTRICAL PARTS

No.	Part No.	Description
501	1-555-839-21	CORD, SPEAKER
502	1-556-477-00	CORD (WITH CONNECTOR)

NOTE: Items marked "♣" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.

TROUBLE CHECKS

The following checks will assist in the correction of most problems which you may encounter with your set.

Before going through the check list below, first pay attention to the following fundamental points.

- The power cord must be connected firmly.
- The speaker connection must also be firm.
- The cables must be connected firmly.

RADIO PROGRAM RECEPTION

The TUNED indicator reading is unstable.

- Adjust the antenna.

The STEREO indicator flickers

- Adjust the antenna.

Severe hum or noise

- The signal strength is too weak.
Connect the external antenna. See page 10 or 11.
- Adjust the antenna.
- Connect the ground wire.

Last station memory is not retained

- Check that the batteries for retaining the frequency are installed correctly.

CASSETTE DECK OPERATION

The ● button cannot be depressed.

- No cassette in the cassette holder.
- The tab is removed from the cassette. See page 16.

The ● button or ► button cannot be depressed.

- The tape is wound completely.

Tape does not move even when the ► button is pressed.

- The II button is depressed.

Recording or playback cannot be made or there is a decrease in sound level.

- Dirty heads.
- Magnetic contamination on the record/playback head.
- Improper setting of the FUNCTION selectors.

Excessive wow or flutter, or sound drop-out.

- Contamination of the capstan or pinch roller.

Insufficient erasure

- Magnetic contamination of the erase head.

Increase of noise or erasure of high frequencies

- Magnetic built-up of the erase head.

Unbalanced tone in higher frequencies

- Improper setting of the DOLBY NR switch. If recorded with the switch set to ON, play back with it at ON. If recorded with it set to OFF, play back with it at OFF.
- Improper setting of the TAPE SELECTOR switch. See page 15. If recorded in the wrong position, adjust the tone controls in playback.

Incorrect AMS operation

- Blank space between the selections may be too short.

GENERAL

No audio

- Slide the volume control to the right.
- Check the FUNCTION selector setting.

No audio from one channel or unbalanced left and right volume

- Adjust the BALANCE control.
- Check the speaker connections of the inoperative channel.

Reverse left and right sound

- Check the speaker cord connection and speaker location.

Lack of bass sound or apparently imprecise physical location or musical instruments

- Check the speaker connection for proper phasing.

ELECTROLYTIC CAPACITORS

RATING → : Use the high voltage rated one.						
CAP. (μF)	6.3 VOLT. PART No.	10 VOLT. PART No.	16 VOLT. PART No.	25 VOLT. PART No.	35 VOLT. PART No.	50 VOLT. PART No.
0.47					→	1-121-726-00
1.0					→	1-121-391-00
2.2					→	1-121-450-00
3.3	→	→	→	1-121-392-00	→	1-121-393-00
4.7	→	→	→	1-121-395-00	→	1-121-396-00
10	→	→	1-121-651-00	1-121-398-00	→	1-121-738-00
22	→	→	1-121-479-00	1-121-480-00	1-121-662-00	1-121-152-00
33	→	→	1-121-403-00	1-121-404-00	1-121-652-00	1-121-405-00
47	→	1-121-352-00	1-121-409-00	1-121-410-00	1-121-653-00	1-121-411-00
100	→	1-121-414-00	1-121-415-00	1-121-416-00	1-121-357-00	1-121-417-00
220	1-121-417-00	1-121-420-00	1-121-421-00	1-121-422-00	1-121-261-00	1-121-423-00
330	1-121-751-00	1-121-805-00	1-121-521-00	1-121-654-00	1-121-655-00	1-121-656-00
470	1-121-424-00	1-121-425-00	1-121-426-00	1-121-733-00	1-121-361-00	1-121-810-00
1000	—	1-121-736-00	1-121-245-00	1-121-657-00	1-121-388-00	1-123-061-00
2200	1-121-658-00	1-121-659-00	1-121-660-00	1-123-067-00	1-121-984-00	—
3300	1-121-661-00	1-123-075-00	1-123-071-00	—	—	—

CAP. (μF)	100 VOLT. PART No.	160 VOLT. PART No.	250 VOLT. PART No.	350 VOLT. PART No.
0.47	—	—	—	—
1.0	1-123-249-00	1-123-252-00	1-123-003-00	1-121-168-00
2.2	1-123-250-00	1-123-026-00	—	1-123-028-00
3.3	1-121-995-00	—	1-123-004-00	1-123-006-00
4.7	1-123-255-00	1-121-246-00	1-121-759-00	1-123-007-00
10	1-121-126-00	1-121-999-00	1-123-254-00	1-123-008-00
22	1-121-996-00	1-123-253-00	1-123-005-00	1-123-022-00
33	1-121-997-00	1-121-757-00	—	—
47	1-123-251-00	1-121-919-00	—	—
100	1-123-084-00	—	—	—

CERAMIC CAPACITORS

RATING							
CAP. (pF)	50 VOLT. PART No.	CAP. (pF)	50 VOLT. PART No.	CAP. (pF)	50 VOLT. PART No.	CAP. (μF)	50 VOLT. PART No.
0.5	1-101-837-00	22	1-102-959-00	150	1-101-361-00	0.001	1-102-074-00
0.75	1-101-586-00	24	1-102-960-00	160	1-101-367-00	0.0012	1-102-118-00
1.0	1-102-934-00	27	1-102-961-00	180	1-102-976-00	0.0015	1-102-119-00
1.5	1-101-576-00	30	1-102-962-00	200	1-102-977-00	0.0018	1-102-120-00
2.0	1-102-935-00	33	1-102-963-00	220	1-102-978-00	0.0022	1-102-121-00
3	1-102-936-00	36	1-102-964-00	240	1-102-979-00	0.0027	1-102-122-00
4	1-102-937-00	39	1-102-965-00	270	1-102-980-00	0.0033	1-102-123-00
5	1-102-942-00	43	1-102-966-00	300	1-102-981-00	0.0039	1-102-124-00
6	1-102-943-00	47	1-101-880-00	330	1-102-820-00	0.0047	1-102-125-00
7	1-102-944-00	51	1-101-882-00	360	1-102-821-00	0.0056	1-102-126-00
8	1-102-945-00	56	1-101-884-00	390	1-102-822-00	0.0068	1-102-127-00
9	1-102-946-00	62	1-101-886-00	430	1-102-823-00	0.0082	1-102-128-00
10	1-102-947-00	68	1-101-888-00	470	1-102-824-00	0.01	1-102-129-00
11	1-102-948-00	75	1-101-890-00	510	1-101-059-00	0.022	1-101-005-00
12	1-102-949-00	82	1-102-971-00	560	1-102-115-00	0.047	1-101-006-00
13	1-102-950-00	91	1-102-972-00	680	1-102-116-00		
15	1-102-951-00	100	1-102-973-00	820	1-102-117-00		
16	1-102-952-00	110	1-102-815-00				
18	1-102-953-00	120	1-102-816-00				
20	1-102-958-00	130	1-101-081-00				

0.001μF = 1,000pF

CERAMIC (SEMICONDUCTOR) CAPACITORS

RATING → : Use the high voltage rated one.					
CAP. (μF)	25 VOLT. PART No.	50 VOLT. PART No.	CAP. (μF)	25 VOLT. PART No.	50 VOLT. PART No.
0.001	→	1-161-039-00	0.018	1-161-016-00	1-161-054-00
0.0012	→	1-161-040-00	0.022	1-161-017-00	1-161-055-00
0.0015		1-161-041-00	0.027	1-161-018-00	1-161-056-00
0.0018		1-161-042-00	0.033	1-161-019-00	1-161-057-00
0.0022		1-161-043-00	0.039	1-161-010-00	1-161-058-00
0.0027	→	1-161-044-00	0.047	1-161-021-00	1-161-059-00
0.0033	→	1-161-045-00	0.056	→	1-161-060-00
0.0039	→	1-161-046-00	0.068	→	1-161-061-00
0.0047	→	1-161-047-00	0.082	1-161-024-00	1-161-062-00
0.0056	→	1-161-048-00	0.1	1-161-025-00	1-161-063-00
0.0068	→	1-161-049-00			
0.0082	1-161-012-00	1-161-050-00			
0.01	1-161-013-00	1-161-051-00			
0.012	→	1-161-052-00			
0.015	1-161-015-00	1-161-053-00			

MYLAR CAPACITORS

RATING											
CAP. (μF)	50 VOLT.	100 VOLT.	200 VOLT.	CAP. (μF)	50 VOLT.	100 VOLT.	200 VOLT.	CAP. (μF)	50 VOLT.	100 VOLT.	200 VOLT.
	PART No.	PART No.	PART No.		PART No.	PART No.	PART No.		PART No.	PART No.	PART No.
0.001	1-108-227-00	1-108-365-00	1-108-409-00	0.01	1-108-239-00	1-108-377-00	1-108-421-00	0.1	1-108-251-00	1-108-389-00	1-108-433-00
0.0012	1-108-351-00	1-108-366-00	1-108-410-00	0.012	1-108-357-00	1-108-378-00	1-108-422-00	0.12	1-108-363-00	1-108-390-00	1-108-434-00
0.0015	1-108-228-00	1-108-367-00	1-108-411-00	0.015	1-108-240-00	1-108-379-00	1-108-423-00	0.15	1-108-252-00	1-108-391-00	1-108-435-00
0.0018	1-108-352-00	1-108-368-00	1-108-412-00	0.018	1-108-358-00	1-108-380-00	1-108-424-00	0.18	1-108-364-00	1-108-392-00	1-108-436-00
0.0022	1-108-230-00	1-108-369-00	1-108-413-00	0.022	1-108-242-00	1-108-381-00	1-108-425-00	0.22	1-108-254-00	1-108-393-00	1-108-437-00
0.0027	1-108-353-00	1-108-370-00	1-108-414-00	0.027	1-108-359-00	1-108-382-00	1-108-426-00	0.27	1-108-854-00	—	—
0.0033	1-108-232-00	1-108-371-00	1-108-415-00	0.033	1-108-244-00	1-108-383-00	1-108-427-00	0.33	1-108-855-00	—	—
0.0039	1-108-354-00	1-108-372-00	1-108-416-00	0.039	1-108-360-00	1-108-384-00	1-108-428-00	0.39	1-108-856-00	—	—
0.0047	1-108-234-00	1-108-373-00	1-108-417-00	0.047	1-108-246-00	1-108-385-00	1-108-429-00	0.47	1-108-857-00	—	—
0.0056	1-108-355-00	1-108-374-00	1-108-418-00	0.056	1-108-361-00	1-108-386-00	1-108-430-00				
0.0068	1-108-237-00	1-108-375-00	1-108-419-00	0.068	1-108-249-00	1-108-387-00	1-108-431-00				
0.0082	1-108-356-00	1-108-376-00	1-108-420-00	0.082	1-108-362-00	1-108-388-00	1-108-432-00				



TANTALUM CAPACITORS

RATING							
→ : Use the high voltage rated one.							
CAP. (μF)	3.15 VOLT.	6.3 VOLT.	10 VOLT.	16 VOLT.	20 VOLT.	25 VOLT.	35 VOLT.
	PART No.	PART No.	PART No.	PART No.	PART No.	PART No.	PART No.
0.01					→	→	1-131-396-00
0.015						→	1-131-397-00
0.022						→	1-131-398-00
0.033						→	1-131-399-00
0.047						→	1-131-400-00
0.068					→	→	1-131-401-00
0.1					→	→	1-131-402-00
0.15					→	→	1-131-403-00
0.22					→	→	1-131-404-00
0.33					→	1-131-409-00	1-131-405-00
0.47	—	—	—	—	1-131-412-00	→	1-131-406-00
0.68	—	—	—	1-131-415-00	→	1-131-410-00	1-131-407-00
1.0	—	—	1-131-418-00	—	1-131-413-00	→	1-131-408-00
1.5	—	1-131-421-00	—	1-131-416-00	→	1-131-411-00	1-131-348-00
2.2	1-131-424-00	—	1-131-419-00	—	1-131-414-00	1-131-355-00	1-131-349-00
3.3	—	1-131-422-00	—	1-131-417-00	1-131-362-00	1-131-356-00	1-131-350-00
4.7	1-131-425-00	—	1-131-420-00	1-131-369-00	1-131-363-00	1-131-357-00	1-131-351-00
6.8	—	1-131-423-00	1-131-376-00	1-131-370-00	1-131-364-00	1-131-358-00	1-131-352-00
10	1-131-426-00	1-131-383-00	1-131-377-00	1-131-371-00	1-131-365-00	1-131-359-00	1-131-353-00
15	1-131-390-00	1-131-384-00	1-131-378-00	1-131-372-00	1-131-366-00	1-131-360-00	—
22	1-131-391-00	1-131-385-00	1-131-379-00	1-131-373-00	1-131-367-00		
33	1-131-392-00	1-131-386-00	1-131-380-00	1-131-374-00			
47	1-131-393-00	1-131-387-00	1-131-381-00	—			
68	1-131-394-00	1-131-388-00	—	—			
100	1-131-395-00	—	—	—			



TANTALUM CAPACITORS

RATING						
CAP. (μF)	3 VOLT.	6.3 VOLT.	10 VOLT.	16 VOLT.	20 VOLT.	35 VOLT.
	PART No.	PART No.	PART No.	PART No.	PART No.	PART No.
0.033						1-131-273-00
0.047						1-131-274-00
0.068						1-131-275-00
0.1						1-131-276-00
0.15						1-131-277-00
0.22			—	—	1-131-262-00	1-131-278-00
0.33			—	—	1-131-263-00	1-131-279-00
0.47			1-131-169-00	—	1-131-264-00	1-131-280-00
0.68			—	1-131-258-00	1-131-265-00	1-131-281-00
1.0			1-131-254-00	—	1-131-266-00	1-131-282-00
1.5		1-131-250-00	—	—	1-131-267-00	1-131-283-00
2.2		—	—	1-131-259-00	1-131-268-00	1-131-284-00
3.3		—	1-131-255-00	—	1-131-269-00	—
4.7		1-131-251-00	1-131-171-00	—	1-131-270-00	—
6.8		—	—	1-131-260-00	1-131-271-00	—
10	—	—	1-131-256-00	—	1-131-272-00	—
15	—	1-131-252-00	—	1-131-261-00		
22	—	—	1-131-257-00	—		
33	1-131-176-00	1-131-253-00	1-131-173-00	—		
47	1-131-288-00	1-131-174-00	—	—		
100	1-131-177-00					

FM STEREO/FM-AM TUNER [ST-78L]

*AEP Model
UK Model*



Note: ST-78L is an FM stereo/FM-AM tuner in FH-7.

MELF (Metal Electrodes Face-Bonding) Components (AEP, E Model)

Warning

If MELF components are forcibly removed from the printed circuit board with pincers or pliers, the circuit board pattern is likely to peel away. Always remove MELF components according to the procedure described on the next page. Replace MELF components with the lead type components.

MELF components are soldered directly to the surface of the printed circuit board.

MELF resistors and capacitors have the same dimensions and are distinguished by their background colors: light brown for resistors, and pink or light green for capacitors.

The MELF resistor color coding is the same as for conventional resistors, and MELF capacitor color coding is the same as for tube-type ceramic capacitors. Note, however, that all MELF resistors are rated at $\frac{1}{4}$ W and $\pm 5\%$.

Components larger than resistors and without a color code are cross conductors, which are used instead of jumper wires.

1. Structure

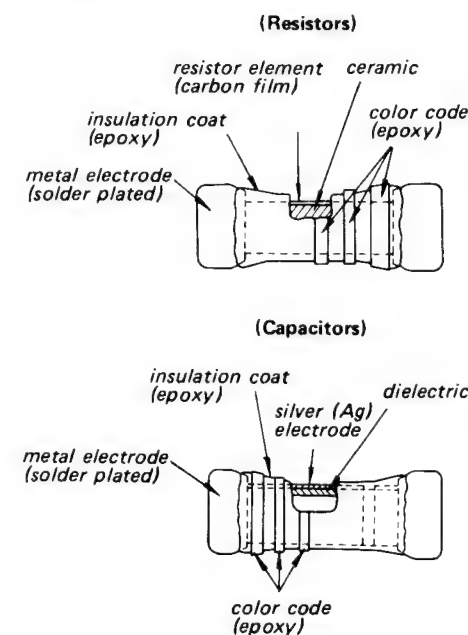
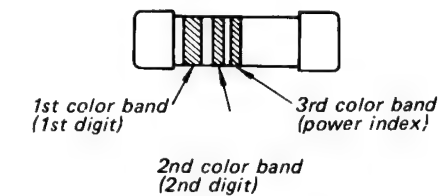
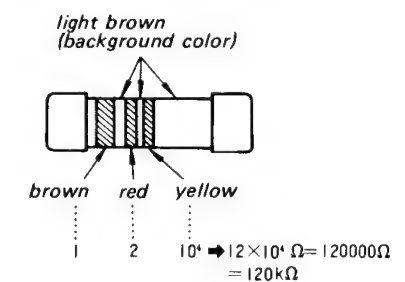


Fig. 1

2. Color Code Reading



(Example of Resistor)



(Example of Capacitor)

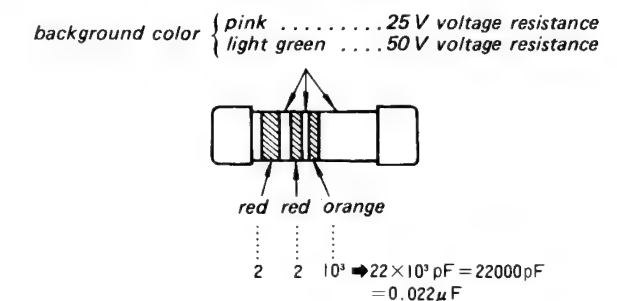


Fig. 2

3. How to Mount

Use a soldering iron with a tip 4 mm in diameter at the angle shown.

1. Bring the component into contact with the soldering iron tip.
2. The solder will flow onto the component. (The soldering iron should be held at an angle of about 45 degrees.)
3. Once the solder has flowed, remove the soldering iron.

MELF (Metal Electrodes Face-Bonding) Components (AEP, E Model)

Warning

If MELF components are forcibly removed from the printed circuit board with pincers or pliers, the circuit board pattern is likely to peel away. Always remove MELF components according to the procedure described on the next page. Replace MELF components with the lead type components.

MELF components are soldered directly to the surface of the printed circuit board.

MELF resistors and capacitors have the same dimensions and are distinguished by their background colors: light brown for resistors, and pink or light green for capacitors.

The MELF resistor color coding is the same as for conventional resistors, and MELF capacitor color coding is the same as for tube-type ceramic capacitors. Note, however, that all MELF resistors are rated at $\frac{1}{4}$ W and $\pm 5\%$.

Components larger than resistors and without a color code are cross conductors, which are used instead of jumper wires.

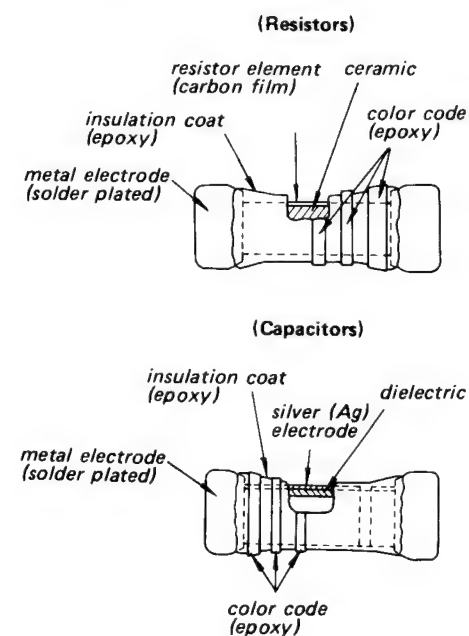
1. Structure

Fig. 1

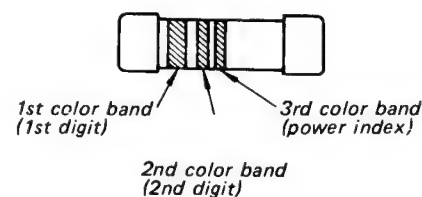
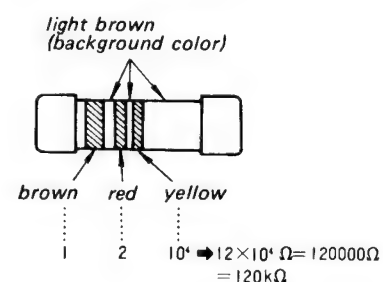
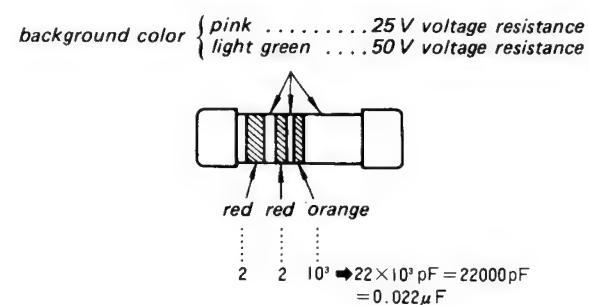
2. Color Code Reading**(Example of Resistor)****(Example of Capacitor)**

Fig. 2

3. How to Remove MELF Components and Mount Replacements

Use a soldering iron of at least 40W with an iron tip 4 mm in diameter and file the tip down to the angle shown in the diagram.

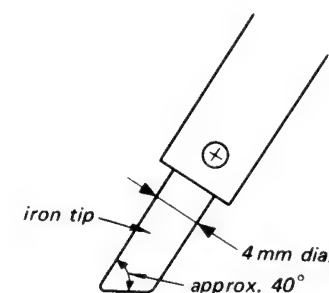


Fig. 3

1. Bring the flat surface of the soldering iron in equal contact with both soldered ends of the component.
2. The solder should melt in about 4 seconds. (The solder will melt more readily if a small amount of solder is attached to the iron tip and the iron tip is placed against the component.)
3. Once the solder has melted, tap the component aside with the tip of the soldering iron, and remove it from the board.

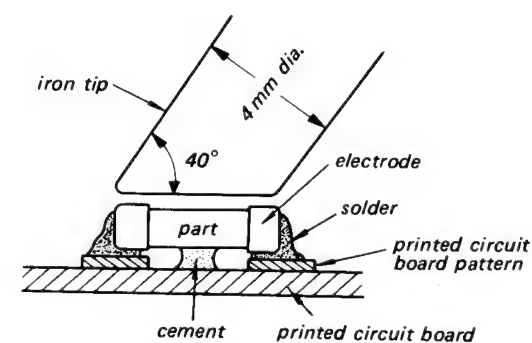


Fig. 4

4. Use lead type resistors or capacitors to replace the MELF components. These replacements may be mounted either with short leads (see Fig. 5), or by covering a lead with tubing (see Fig. 6).

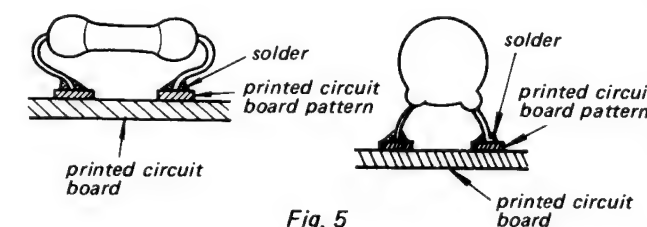


Fig. 5

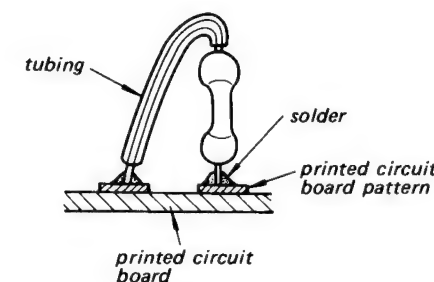
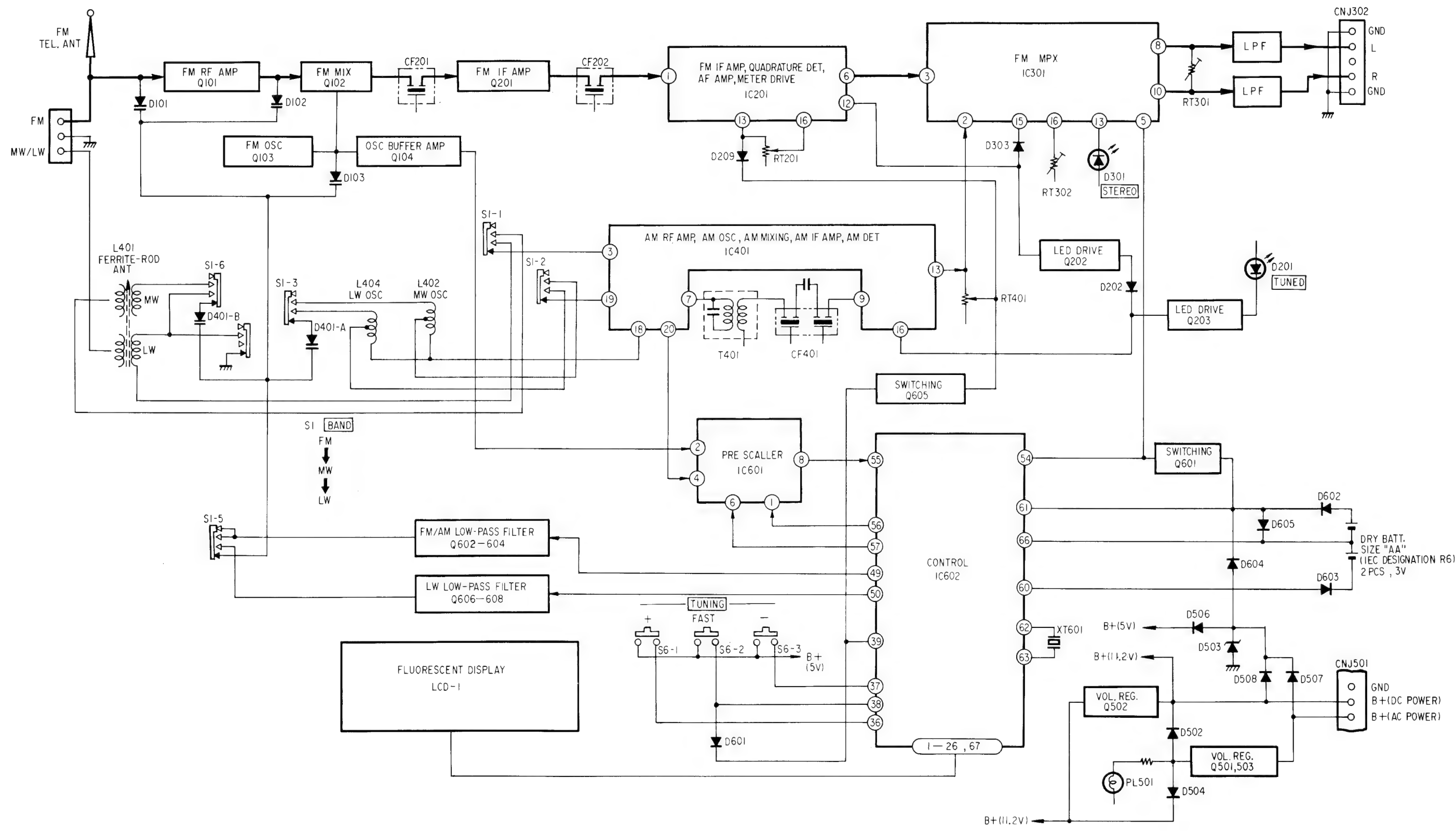


Fig. 6

SECTION 1
BLOCK DIAGRAM



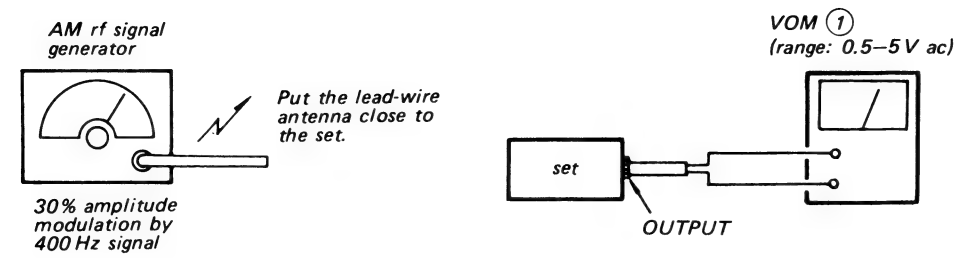
SECTION 2 ADJUSTMENTS

MW/LW SECTION

Setting:

Band Selector: MW/LW

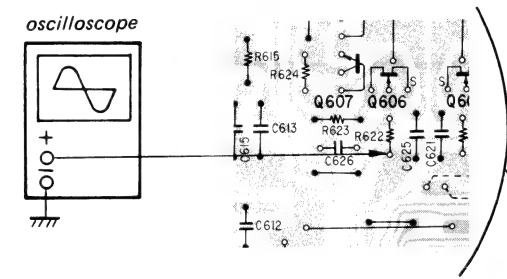
Setup: after adjusting LW, adjust MW.



- Repeat the procedures in each adjustment several times, and the frequency coverage and tracking adjustments should be finally done by the trimmer capacitors.

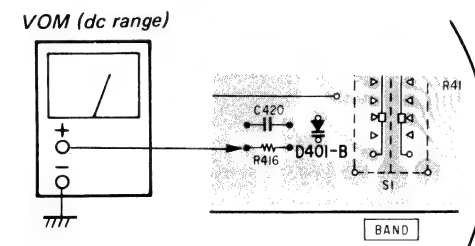
LW PLL Bias Adjustment

1. Connect the oscilloscope as shown on the right.
2. Set BAND selector switch (S1) to LW.
3. Push TUNING (+, -) button for 153kHz.
4. Adjust RT602 so that the waveform is shown below.
 $A : B = 1 : 1$
A is approx. 0.7V
5. Confirm that the waveform is locked when the set is tuned to 344kHz.



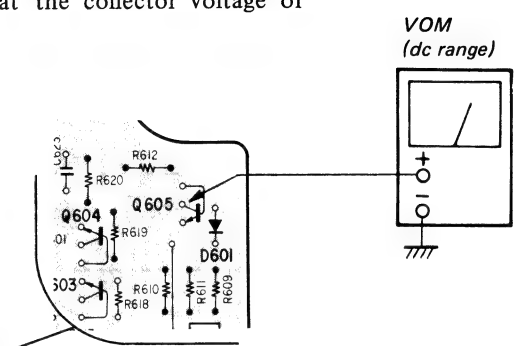
MW/LW OSC Voltage Adjustment

1. Set BAND selector switch (S1) to MW.
2. Push TUNING (+, -) button for 522kHz. Adjust L402 for 1.0 - 1.1V VOM reading.
3. Push the button for 1,602kHz. Adjust CT401 for 8.9 - 9.0V VOM reading.
4. Set BAND selector switch (S1) to LW.
5. Push TUNING (+, -) button for 153kHz. Adjust L404 for 1.0 - 1.1V VOM reading.
6. Push the button for 344kHz. Adjust CT-403 for 8.9 - 9.0V VOM reading.



MW Slow Speed Action Level Adjustment

1. Set BAND selector switch (S1) to MW. Confirm that the receiving condition is no signal.
2. Adjust RT401 so that the collector voltage of Q605 is 4.0 - 5.0V.



MW IF ADJUSTMENT

Adjust for a maximum reading on VOM (1).

T401	450kHz
------	--------

LW TRACKING ADJUSTMENT

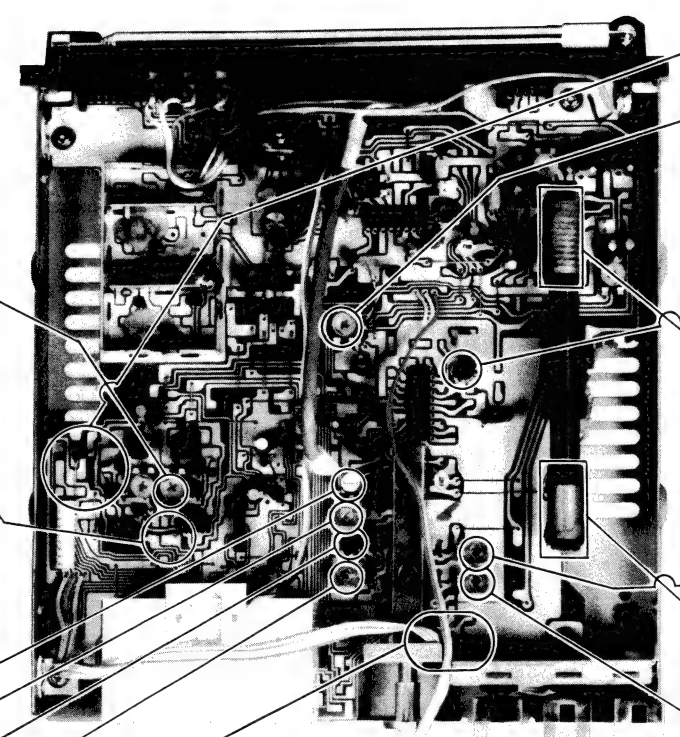
Adjust for a maximum reading on VOM (1).

L401	170kHz
CT404	310kHz

MW TRACKING ADJUSTMENT

Adjust for a maximum reading on VOM (1).

L401	603kHz
CT402	1,404kHz



FM SECTION 1

Setting:

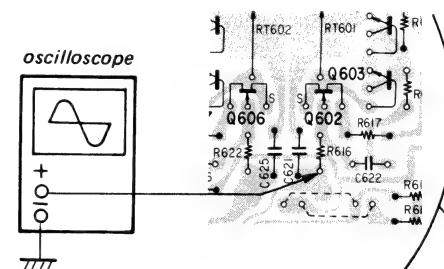
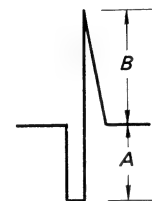
Band Selector: FM

FM rf Stereo Signal	FM rf Monaural Signal
Carrier frequency: 98MHz Modulation: Audio 400Hz, 16.25kHz deviation Subchannel 38kHz 16.25kHz deviation Pilot 19kHz 7.5kHz deviation	Carrier frequency: 98MHz Modulation: 1kHz, 40kHz deviation

FM/MW PLL Bias Adjustment

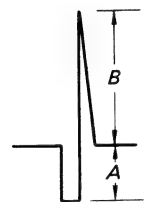
1. Connect the oscilloscope as shown on the right.
2. Set BAND selector switch (S1) to FM.
3. Push TUNING (+, -) button for 87.5MHz.
4. Adjust RT601 so that the waveform is shown below.

A : B = 2.0 : more than 3.0
A is approx. 0.4V



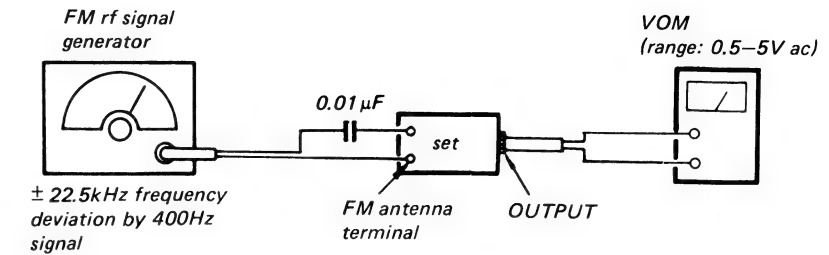
5. Push the button for 108MHz.
Confirm that the waveform is locked as shown below.

A : B = 1.5 : 3.5
A is approx. 0.3V

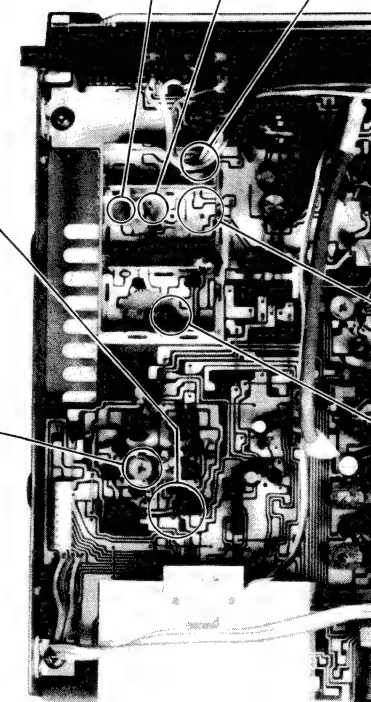
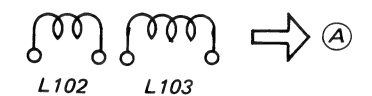


6. Set BAND selector switch (S1) to MW.
Confirm that the waveform is locked when the set is tuned to 522kHz.
7. Confirm that the waveform is locked when the set is tuned to 1,602kHz.

FM Tracking Adjustment

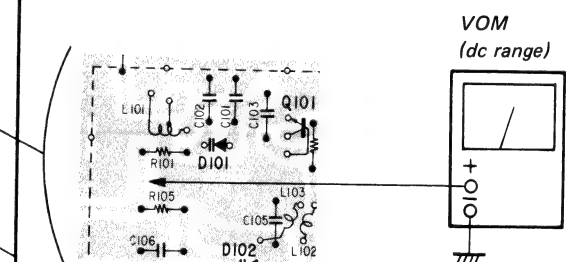


1. Push TUNING (+, -) button for 98MHz.
2. Approach L102 and L103 not to contact each other.
3. Adjust L101 and L103, and repeat the adjustment 2 - 3 times for maximum VTVM reading.
(Adjust L103 in the direction as shown by arrow A).



FM OSC Voltage Adjustment

Push TUNING (+, -) button for 108MHz.
Adjust L105 for 8.9 - 9V VOM reading.



FM SECTION 2

TUNED Indicator Adjustment

Setting:

Modulation: no modulation
Output level: 25dB (75Ω terminal end output)

Procedure:

Adjust RT201 so that TUNED indicator (D201) lights up.

VCO Adjustment

Setting:

Output level: 1mV (60dB)

Procedure:

Adjust RT302 so that the frequency counter indicates 19kHz ±50Hz.

FM Stereo Separation Adjustment

Procedure:

Carrier frequency: 98MHz
Output level: 1mV (60dB)
Modulation:
Audio (400Hz): 16.25kHz deviation
Pilot (19kHz): 7.5kHz deviation
Sub-channel: 16.25kHz deviation

FM stereo signal generator output channel	VTVM connection	VTVM reading (dB)
L-CH	L-CH	Ⓐ
R-CH	L-CH	Ⓑ Adjust RT301 for minimum reading.
R-CH	R-CH	Ⓒ
L-CH	R-CH	Ⓓ Adjust RT301 for minimum reading.

L-CH Stereo separation: Ⓐ - Ⓑ
R-CH Stereo separation: Ⓒ - Ⓓ
The separations of both channels should be equal.

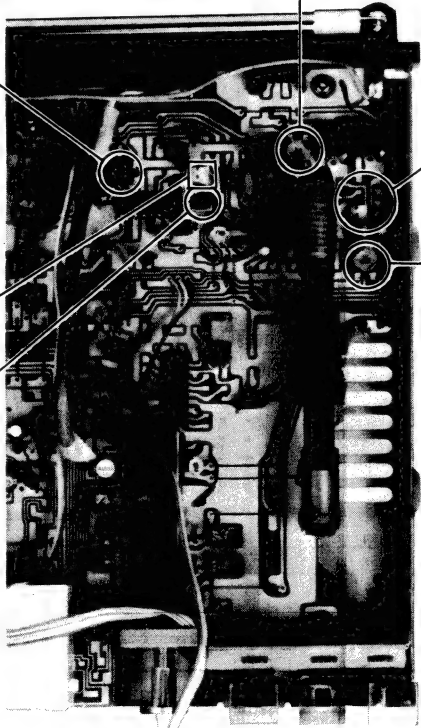
FM Discriminator Adjustment

Setting:

Output level: 1mV (60dB)

Procedure:

Push TUNING (+, -) button for 98MHz.
Adjust T201 for 0V VOM reading.



SECTION 3 DIAGRAMS

FH-7
ST-78L

FH-7
ST-78L

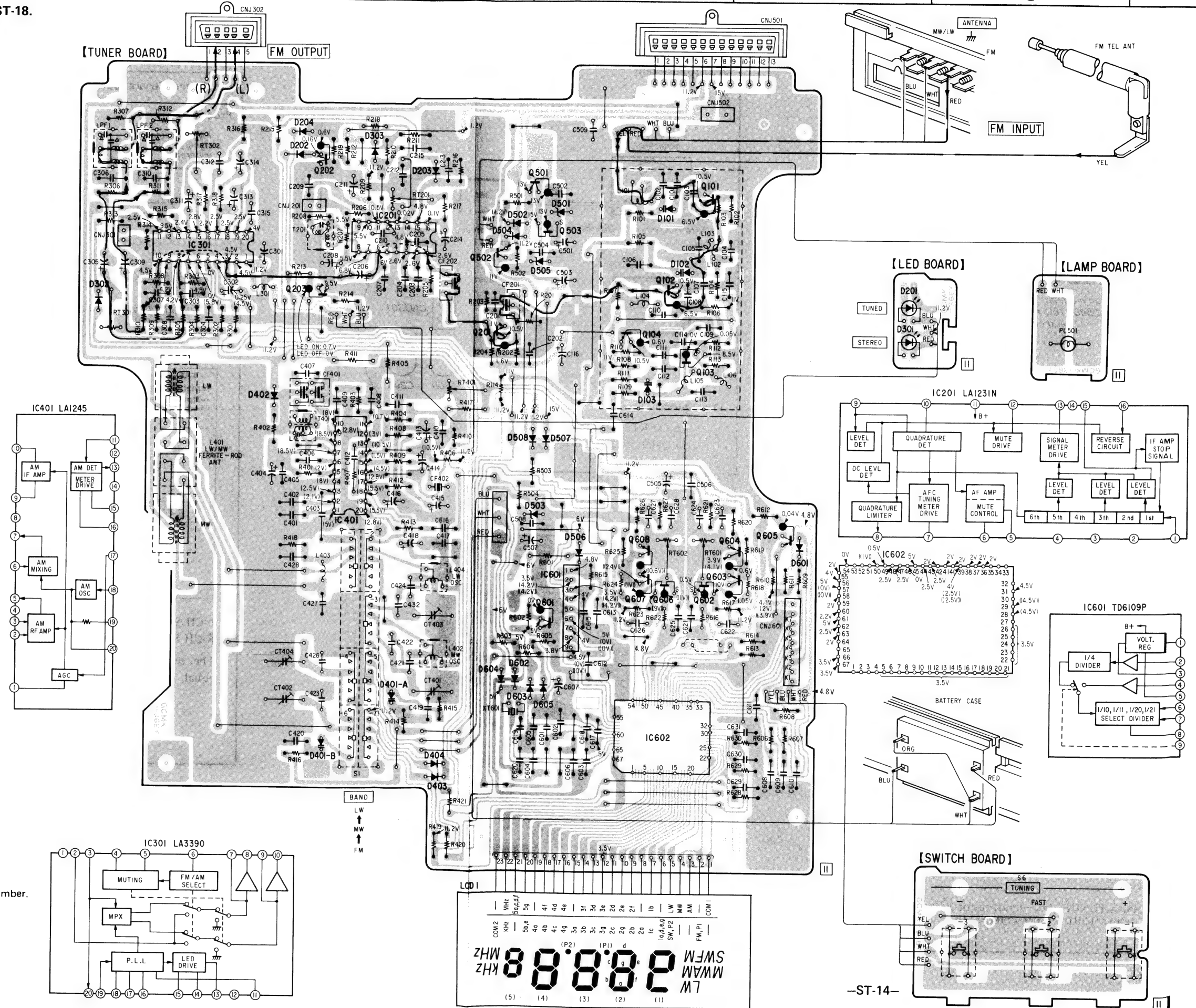
3-1. MOUNTING DIAGRAM

Semiconductor Lead Layouts : See Page ST-18.

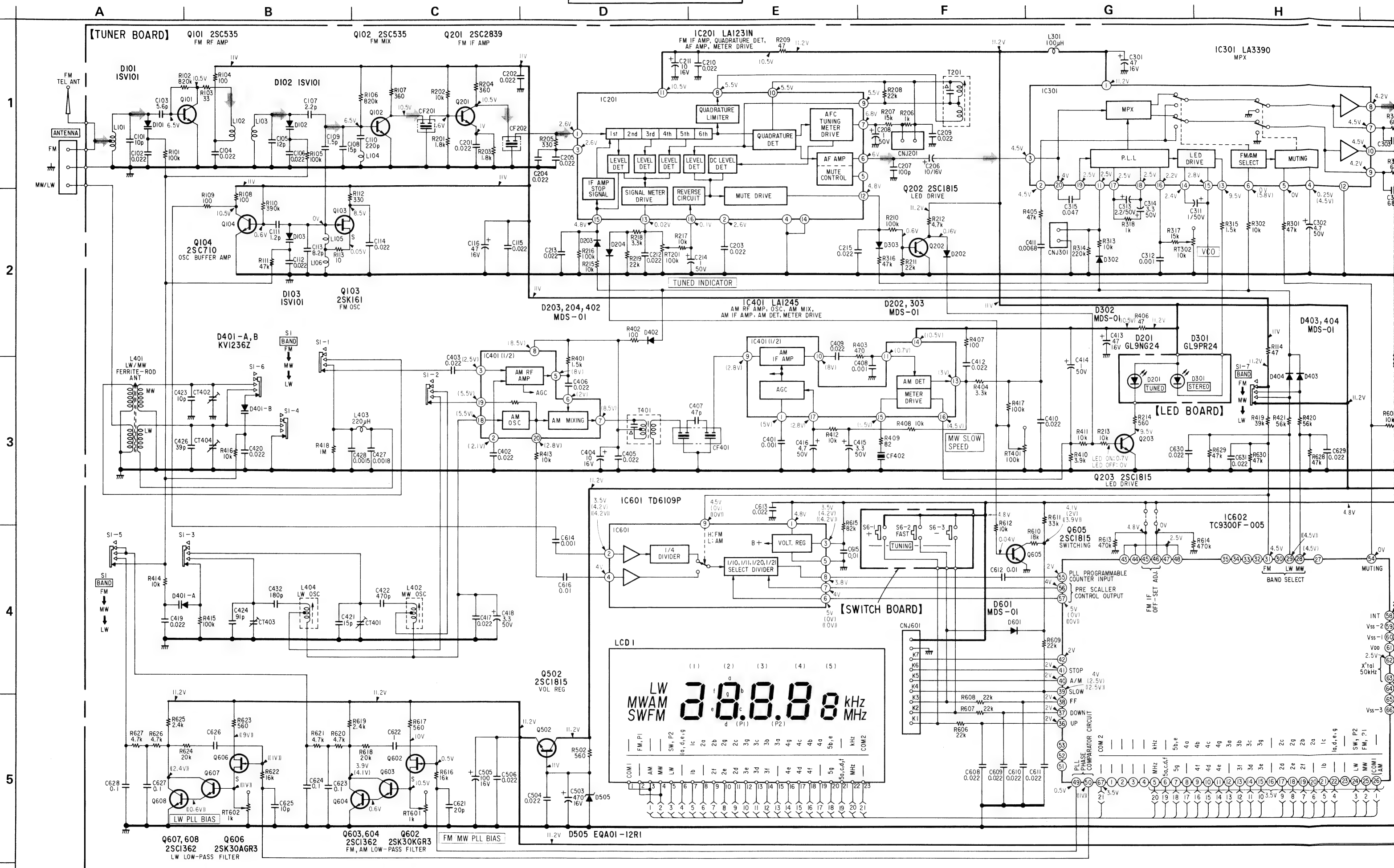
Q, IC	D
202	204
	303
	202
	203
501	
101	501,101
	502
503	504
IC201	
IC301	502
	505
	102
203	102
	302
201,104	301
103	
	402
IC401	103
	508,507
	503
605	
608,604	506
607,603	601
606,602	
IC601	
601	
	604,602
	603,605
	401-A
IC602	
	401-B
	404
	403
Q, IC	D

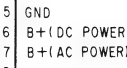
Note:

- indicates side identified with part number.
- B+ pattern
- signal path
- L-CH signal path
- R-CH signal path



FH-7
ST-78L

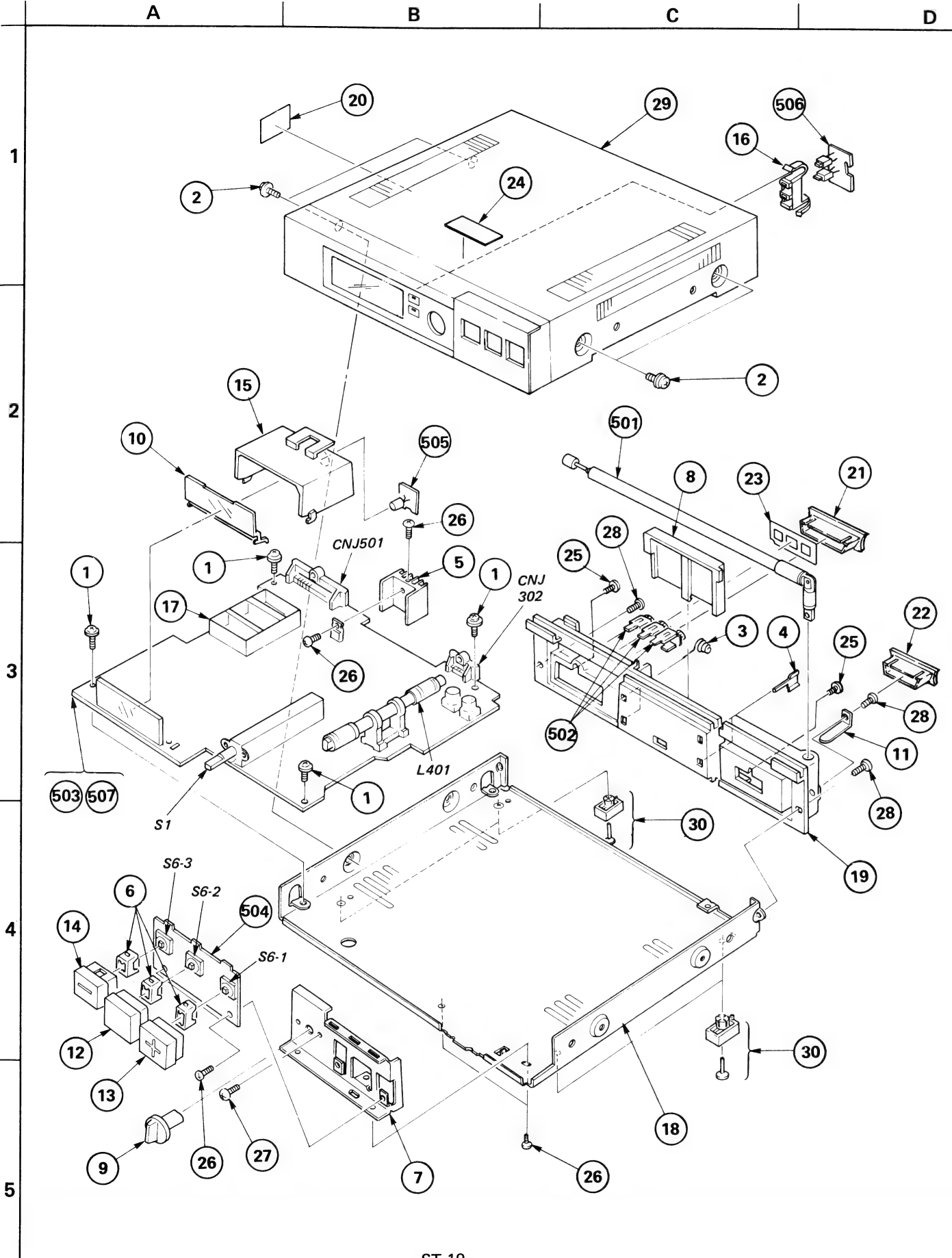




SECTION 4
EXPLODED VIEW AND PARTS LIST

FH-7
ST-78L

FH-7
ST-78L



GENERAL SECTION

No.	Part No.	Description
1	3-701-589-00	SCREW, SELF-TAPPING
2	3-703-354-11	(AEP-Germany)...SCREW, CASE, CLAW
2	3-703-668-00	(AEP.UK).....SCREW, CASE
3	3-883-424-00	SPRING
4	3-883-428-00	PLATE, TERMINAL (POSITIVE)
5	4-863-132-00	HEAT SINK (SMALL)
6	4-881-725-00	RING (TACT), FLEXIBLE
7	4-884-844-00	CHASSIS, SUB
8	4-884-845-00	LID, BATTERY CASE
9	4-884-847-00	KNOB, ROTARY SWITCH
10	4-884-848-00	ILLUMINATOR
11	4-884-850-00	LUG, ANTENNA
12	4-884-852-00	KNOB (16X16), SQUARE (FAST)
13	4-884-853-00	KNOB (16X16), SQUARE (+)
14	4-884-854-00	KNOB (16X16), SQUARE (-)
15	4-884-856-00	HOUSE, LAMP
16	4-884-857-00	HOLDER, LED
17	4-884-858-00	PLATE, SHIELD
18	4-884-859-00	CHASSIS
19	4-884-860-01	(AEP-Germany)...PLATE, JACK
19	4-884-860-11	(AEP.UK).....PLATE, JACK
20	4-884-871-00	(AEP.UK).....LABEL, MODEL NUMBER
20	4-884-929-00	(AEP-Germany)...LABEL, MODEL NUMBER
21	4-884-874-00	COVER, CONNECTOR (A)
22	4-884-876-00	COVER, CONNECTOR (B)
23	4-884-916-00	(AEP.UK).....LABEL, ANTENNA
23	4-884-917-00	(AEP-Germany)...LABEL, ANTENNA
24	4-884-927-00	LABEL (SYSTEM), CAUTION
25	7-685-547-19	SCREW +BTP 3X10 TYPE2 N-S
26	7-685-871-01	SCREW +BVTT 3X6 (S)
27	7-685-871-09	SCREW +BVTT 3X6 (S)
28	7-685-872-09	SCREW +BVTT 3X8 (S)
29	A-4322-460-A	CASE ASSY, PANEL
30	X-4884-801-0	FOOT ASSY, RUBBER

ELECTRICAL PARTS

Ref.No.	Part No.	Description
501	1-501-270-00	ANTENNA, TELESCOPIC
502	1-536-742-00	TERMINAL BOARD, ANTENNA
503	1-608-554-00	PC BOARD, TUNER
504	1-608-555-00	PC BOARD, SWITCH
505	1-608-556-00	PC BOARD, LAMP
506	1-608-557-00	PC BOARD, LED
507	A-4351-323-A	MOUNTED PCB, TUNER
C421	1-102-880-00	CERAMIC 15PF 5% 50V
C423	1-101-999-00	CERAMIC 10PF 0.5PF 50V
C424	1-102-733-00	CERAMIC 91PF 5% 50V
C426	1-102-726-00	CERAMIC 39PF 5% 50V
CF201	1-527-968-71	FILTER, CERAMIC
CF202	1-527-968-71	FILTER, CERAMIC
CF401	1-527-937-00	FILTER, CERAMIC
CF402	1-527-981-00	FILTER, CERAMIC
●CNJ201	1-560-060-00	PIN, CONNECTOR 2P
●CNJ301	1-560-060-00	PIN, CONNECTOR 2P
CNJ302	1-562-067-00	SOCKET, CONNECTOR 5P
CNJ501	1-562-068-00	SOCKET, CONNECTOR 13P
●CNJ502	1-535-115-00	TERMINAL
●CNJ601	1-560-339-00	PIN, CONNECTOR 9P
●CNJ602	1-535-116-00	TERMINAL
CT401	1-141-180-00	CAP, TRIMMER 15P
CT402	1-141-180-00	CAP, TRIMMER 15P
CT403	1-141-171-00	CAP, TRIMMER 20P
CT404	1-141-171-00	CAP, TRIMMER 20P
D101	8-719-800-09	DIODE 1SV101
D102	8-719-800-09	DIODE 1SV101
D103	8-719-800-09	DIODE 1SV101
D201	8-719-903-07	DIODE GL-9NG24
D202	8-719-815-55	DIODE 1S1555
D203	8-719-815-55	DIODE 1S1555
D204	8-719-815-55	DIODE 1S1555
D301	8-719-903-11	DIODE GL-9PR24
D302	8-719-815-55	DIODE 1S1555
D303	8-719-815-55	DIODE 1S1555
D401	8-719-902-79	DIODE KV123622
D402	8-719-815-55	DIODE 1S1555
D403	8-719-815-55	DIODE 1S1555
D404	8-719-815-55	DIODE 1S1555
D501	8-719-910-24	DIODE HZ12B1L
D502	8-719-200-02	DIODE 10E2
D503	8-719-910-64	DIODE HZ6B1L
D504	8-719-815-55	DIODE 1S1555
D505	8-719-991-21	DIODE EQA01-12R1
D506	8-719-815-55	DIODE 1S1555
D507	8-719-815-55	DIODE 1S1555

NOTE:
· Items with no part number and no description are not stocked because they are seldom required for routine service.
· Items marked "●" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
· Due to standardization, parts with part numbers (Δ-ΔΔΔ-ΔΔΔ-XX or Δ-ΔΔΔΔ-ΔΔΔ-X) may be different from those used in the set.

CAPACITORS:
· All capacitors are in μF. Common capacitors are omitted. Refer to the following lists for their part numbers.
MF: μF, PF: μF.
RESISTORS
· All resistors are in ohms. Common 1/4W, 1/8W and 1/16W carbon resistors are omitted. Refer to the following lists for their part numbers.
· F: nonflammable
COILS
· MMH: mH, UH: μH

SEMICONDUCTORS
In each case, U: μ, for example:
UA...: μA..., UPA...: μPA..., UPC...: μPC, UPD...: μPD...

ELECTRICAL PARTS

Ref.No.	Part No.	Description
D508	8-719-815-55	DIODE 1S1555
D601	8-719-815-55	DIODE 1S1555
D602	8-719-815-55	DIODE 1S1555
D603	8-719-815-55	DIODE 1S1555
D604	8-719-815-55	DIODE 1S1555
D605	8-719-815-55	DIODE 1S1555
IC201	8-759-812-31	IC LA1231
IC301	8-759-833-90	IC LA3390
IC401	8-759-812-45	IC LA1245
IC601	8-759-201-03	IC TD6109P
IC602	8-759-201-02	IC TC9300F-005
L101	♣;1-422-093-00	COIL, AIR-CORE
L102	♣;1-422-094-00	COIL, AIR-CORE
L103	♣;1-422-096-00	COIL, AIR-CORE
L104	♣;1-422-039-00	COIL, AIR-CORE
L105	♣;1-422-098-00	COIL, AIR-CORE
L106	♣;1-422-099-00	COIL, AIR-CORE
L301	1-408-421-21	MICRO INDUCTOR 100UH
L401	1-402-002-00	ANTENNA, FERRITE-ROD (LW/MW)
L402	1-406-033-00	COIL (OSC)
L403	1-408-425-21	MICRO INDUCTOR 220UH
L404	1-406-034-00	COIL (OSC)
LCD1	1-806-544-00	DISPLAY PANEL, LIQUID CRYSTAL
LPF1	1-235-164-00	FILTER, LOW PASS
LPF2	1-235-164-00	FILTER, LOW PASS
PL501	1-518-511-00	LAMP, PILOT
Q101	8-729-353-52	TRANSISTOR 2SC535
Q102	8-729-353-52	TRANSISTOR 2SC535
Q103	8-729-216-13	TRANSISTOR 2SK161
Q104	8-729-671-14	TRANSISTOR 2SC710-14
Q201	8-729-883-92	TRANSISTOR 2SC2839
Q202	8-729-663-47	TRANSISTOR 2SC1364
Q203	8-729-663-47	TRANSISTOR 2SC1364
Q501	8-729-288-02	TRANSISTOR 2SD880
Q502	8-729-663-47	TRANSISTOR 2SC1364
Q503	8-729-224-63	TRANSISTOR 2SK246-BL
Q601	8-729-663-47	TRANSISTOR 2SC1364
Q602	8-729-203-05	TRANSISTOR 2SK30A-GR3
Q603	8-729-665-47	TRANSISTOR 2SC1362
Q604	8-729-665-47	TRANSISTOR 2SC1362
Q605	8-729-663-47	TRANSISTOR 2SC1364
Q606	8-729-203-05	TRANSISTOR 2SK30A-GR3
Q607	8-729-665-47	TRANSISTOR 2SC1362
Q608	8-729-665-47	TRANSISTOR 2SC1362

ELECTRICAL PARTS

Ref.No.	Part No.	Description
RT201	1-226-854-41	RES, ADJ, CARBON 100K
RT301	1-226-852-41	RES, ADJ, CARBON 22K
RT302	1-228-505-00	RES, ADJ, CARBON 10K
RT401	1-226-854-41	RES, ADJ, CARBON 100K
RT601	1-226-663-00	RES, ADJ, CARBON 1K
RT602	1-226-663-00	RES, ADJ, CARBON 1K
S1	1-554-266-00	SWITCH, ROTARY SLIDE
S6-1	1-552-412-00	SWITCH, KEY BOARD
S6-2	1-552-412-00	SWITCH, KEY BOARD
S6-3	1-552-412-00	SWITCH, KEY BOARD
T201	1-404-419-00	COIL, DISCRIMINATOR
T401	1-404-413-00	TRANSFORMER, IF
XT601	1-527-995-00	VIBRATOR, CRYSTAL

NOTE:

- Items with no part number and no description are not stocked because they are seldom required for routine service.
- Items marked "♣" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- Due to standardization, parts with part numbers (Δ-ΔΔΔ-ΔΔΔ-XX or Δ-ΔΔΔΔ-ΔΔΔ-X) may be different from those used in the set.

CAPACITORS:

- All capacitors are in μF . Common capacitors are omitted. Refer to the following lists for their part numbers.
MF: μF , PF: μF .

RESISTORS

- All resistors are in ohms. Common 1/4W, 1/8W and 1/16W carbon resistors are omitted. Refer to the following lists for their part numbers.
- F : nonflammable

COILS

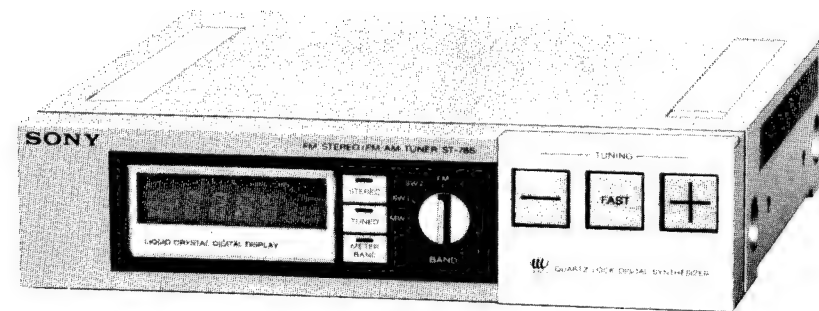
- MMH : mH, UH : μH

SEMICONDUCTORS

- In each case, U : μ , for example:
UA....: μA ..., UPA....: μPA ..., UPC....: μPC ,
UPD....: μPD ...

FM STEREO/FM-AM TUNER [ST-78S]

E Model



Note: ST-78S is an FM stereo/FM-AM tuner in FH-7.

MELF (Metal Electrodes Face-Bonding) Components (AEP, E Model)

Warning

If MELF components are forcibly removed from the printed circuit board with pincers or pliers, the circuit board pattern is likely to peel away. Always remove MELF components according to the procedure described on the next page. Replace MELF components with the lead type components.

MELF components are soldered directly to the surface of the printed circuit board.

MELF resistors and capacitors have the same dimensions and are distinguished by their background colors: light brown for resistors, and pink or light green for capacitors.

The MELF resistor color coding is the same as for conventional resistors, and MELF capacitor color coding is the same as for tube-type ceramic capacitors. Note, however, that all MELF resistors are rated at $\frac{1}{4}$ W and $\pm 5\%$.

Components larger than resistors and without a color code are cross conductors, which are used instead of jumper wires.

1. Structure

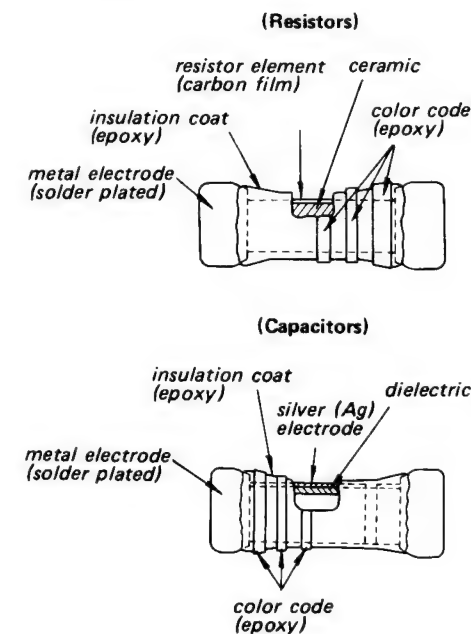
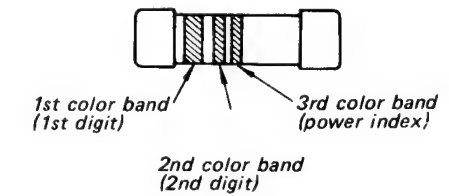
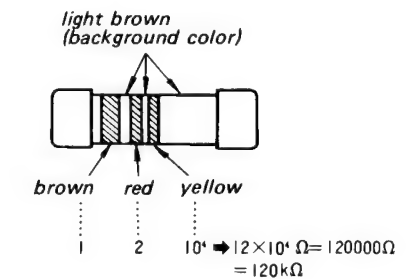


Fig. 1

2. Color Code Reading



(Example of Resistor)



(Example of Capacitor)

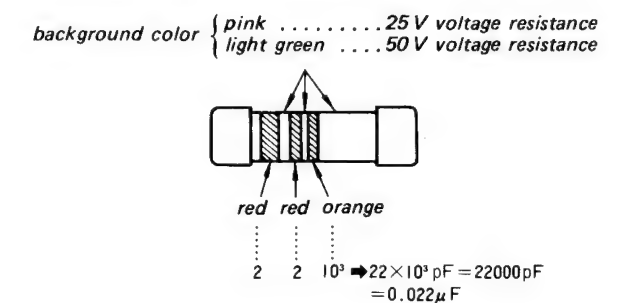


Fig. 2

MELF (Metal Electrodes Face-Bonding) Components (AEP, E Model)

Warning

If MELF components are forcibly removed from the printed circuit board with pincers or pliers, the circuit board pattern is likely to peel away. Always remove MELF components according to the procedure described on the next page. Replace MELF components with the lead type components.

MELF components are soldered directly to the surface of the printed circuit board.

MELF resistors and capacitors have the same dimensions and are distinguished by their background colors: light brown for resistors, and pink or light green for capacitors.

The MELF resistor color coding is the same as for conventional resistors, and MELF capacitor color coding is the same as for tube-type ceramic capacitors. Note, however, that all MELF resistors are rated at $\frac{1}{4}$ W and $\pm 5\%$.

Components larger than resistors and without a color code are cross conductors, which are used instead of jumper wires.

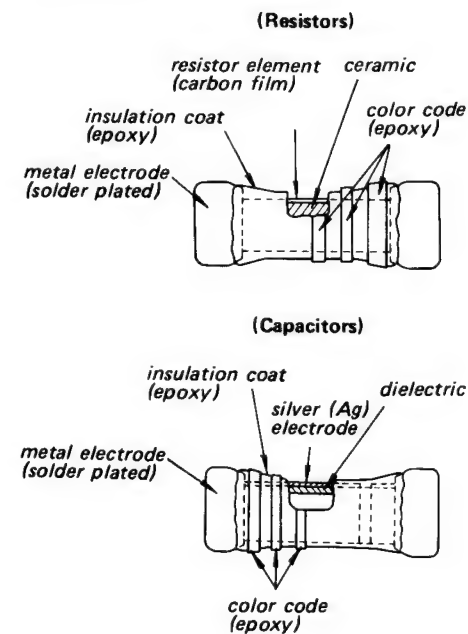
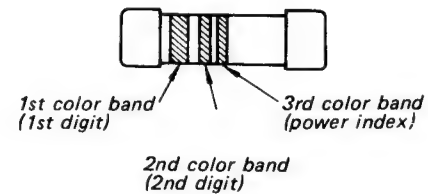
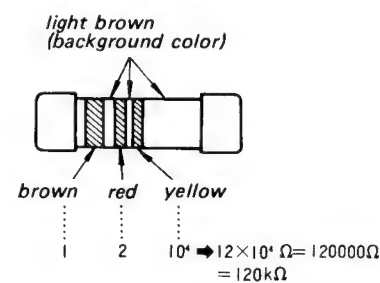
1. Structure

Fig. 1

2. Color Code Reading**(Example of Resistor)****(Example of Capacitor)**

background color { pink 25 V voltage resistance
light green 50 V voltage resistance

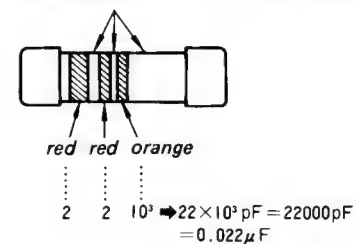


Fig. 2

3. How to Remove MELF Components and Mount Replacements

Use a soldering iron of at least 40W with an iron tip 4 mm in diameter and file the tip down to the angle shown in the diagram.

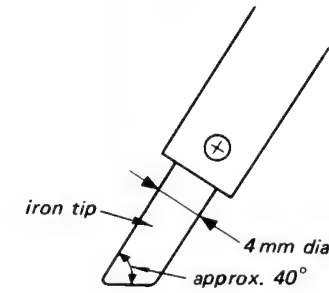


Fig. 3

1. Bring the flat surface of the soldering iron in equal contact with both soldered ends of the component.
2. The solder should melt in about 4 seconds. (The solder will melt more readily if a small amount of solder is attached to the iron tip and the iron tip is placed against the component.)
3. Once the solder has melted, tap the component aside with the tip of the soldering iron, and remove it from the board.

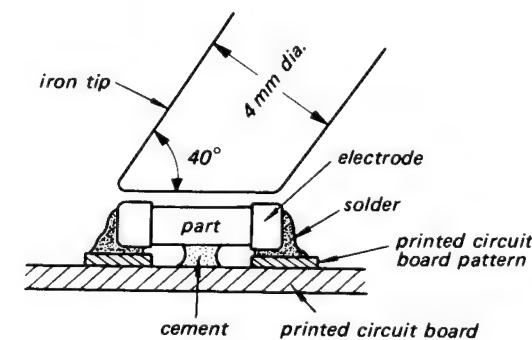


Fig. 4

4. Use lead type resistors or capacitors to replace the MELF components. These replacements may be mounted either with short leads (see Fig. 5), or by covering a lead with tubing (see Fig. 6).

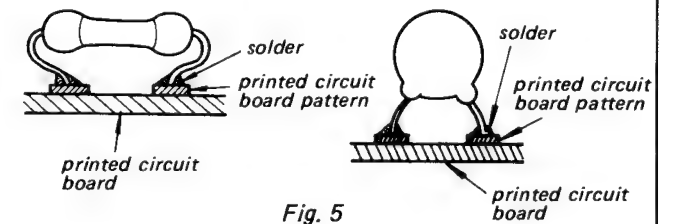


Fig. 5

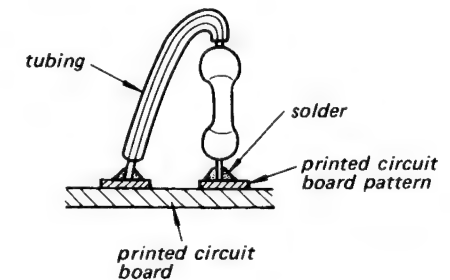
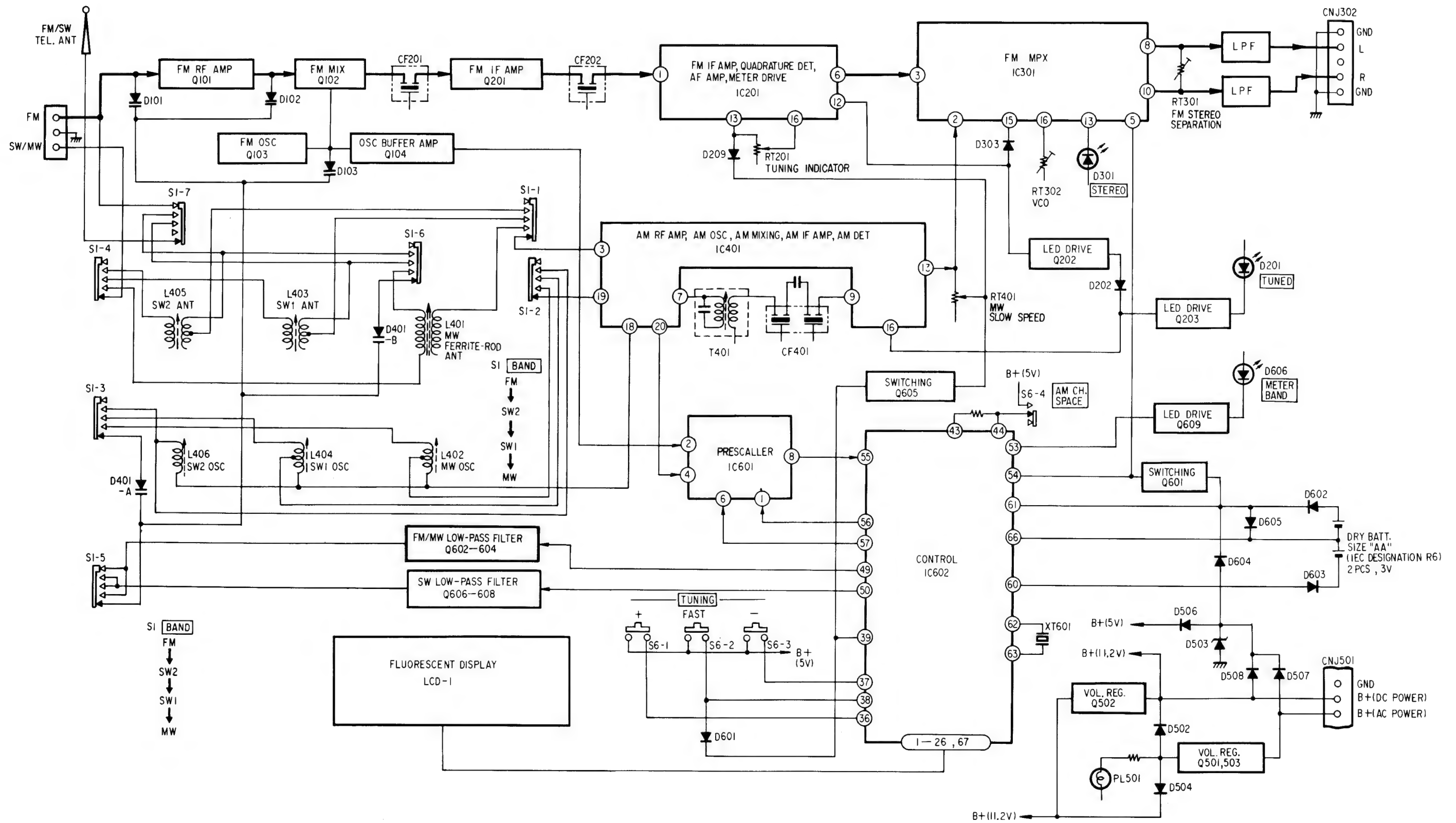


Fig. 6

SECTION 1
BLOCK DIAGRAM



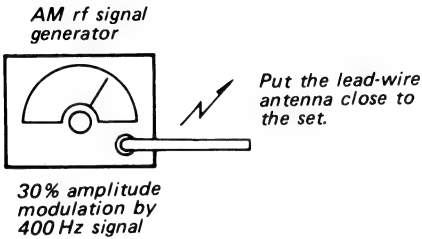
SECTION 2
ADJUSTMENTS

MW/SW SECTION 1

Setting:

Band Selector: MW, SW1, SW2

Setup: Set 9kHz/10kHz selector switch (S6-4) to the 9kHz side.



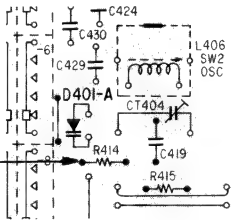
VOM ①
(range: 0.5–5 V ac)

- Repeat the procedures in each adjustment several times, and the frequency coverage and tracking adjustments should be finally done by the trimmer capacitors.

MW/SW1/SW2 OSC Voltage Adjustment

1. Set BAND selector switch (S1) to MW.
2. Push TUNING (+, –) button for 522kHz. Adjust L402 for 1.0 – 1.1V VOM reading.
3. Push the button for 1,602kHz. Adjust CT406 for 8.9 – 9.0V VOM reading.
4. Set BAND selector switch (S1) to SW1.
5. Push TUNING (+, –) button for 3.2MHz. Adjust L404 for 1.0 – 1.1V VOM reading.
6. Push the button for 7.3MHz. Adjust CT405 for 8.9 – 9.0V VOM reading.
7. Set BAND selector switch (S1) to SW2.
8. Push TUNING (+, –) button for 9.5MHz. Adjust L406 for 1.0 – 1.1V VOM reading.
9. Push the button for 21.75MHz. Adjust CT404 for 8.9 – 9.0V VOM reading.

VOM
(dc range)

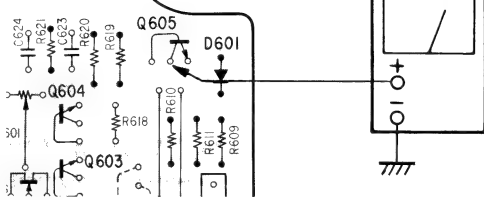


L402
CT406
L404
CT405
L406
CT404

MW Slow Speed Action Level Adjustment

1. Set BAND selector switch (S1) to MW. Confirm that the receiving condition is no signal.
2. Adjust RT401 so that the collector voltage of Q605 is 4.0 – 5.0V.

VOM (dc range)



RT401

MW IF ADJUSTMENT

Adjust for a maximum reading on VOM ①.

T401	450kHz
------	--------

MW TRACKING ADJUSTMENT

Adjust for a maximum reading on VOM ①.

L401	603kHz
------	--------

CT403	1,404kHz
-------	----------

SW1 TRACKING ADJUSTMENT

Adjust for a maximum reading on VOM ①.

CT402	7.3MHz
-------	--------

L403	3.2MHz
------	--------

SW2 TRACKING ADJUSTMENT

Adjust for a maximum reading on VOM ①.

CT401	21.75MHz
-------	----------

L405	9.5MHz
------	--------

T401

L401

CT403

CT402

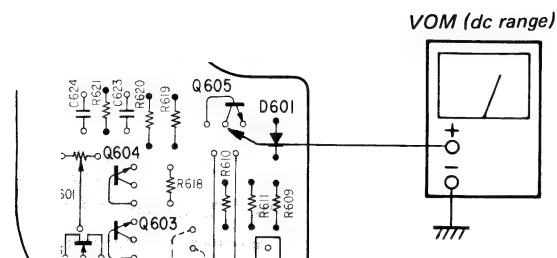
L403

CT401

L405

MW Slow Speed Action Level Adjustment

- Set BAND selector switch (S1) to MW. Confirm that the receiving condition is no signal.
- Adjust RT401 so that the collector voltage of Q605 is 4.0 – 5.0V.



RT401

MW IF ADJUSTMENT

Adjust for a maximum reading on VOM ①.

T401	450kHz
------	--------

MW TRACKING ADJUSTMENT

Adjust for a maximum reading on VOM ①.

L401	603kHz
------	--------

CT403	1,404kHz
-------	----------

SW1 TRACKING ADJUSTMENT

Adjust for a maximum reading on VOM ①.

CT402	7.3MHz
-------	--------

L403	3.2MHz
------	--------

SW2 TRACKING ADJUSTMENT

Adjust for a maximum reading on VOM ①.

CT401	21.75MHz
-------	----------

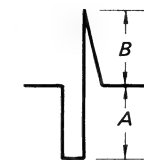
L405	9.5MHz
------	--------

MW/SW SECTION 2

SW1/SW2 PLL Bias Adjustment

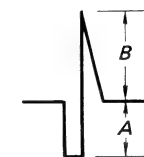
- Connect the oscilloscope as shown below.
- Set BAND selector switch (S1) to SW2.
- Push TUNING (+, –) button for 9.5MHz.
- Adjust RT603 so that the waveform is as shown below.

A : B = 1 : 1
A is more than 0.65V



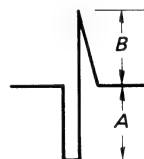
- Push the button for 21.75MHz. Confirm that the waveform is locked as shown below.

A : B = 0.46V : 0.84V
(reference)



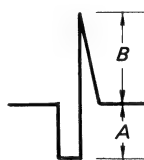
- Set BAND selector switch (S1) to SW1. Confirm that the waveform is locked when the set is tuned to 3.2MHz.

A : B = 1 : 1
A is more than 0.65V

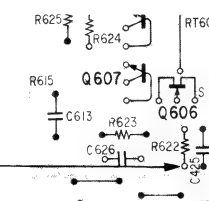
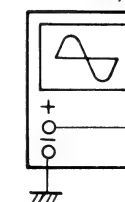


- Confirm that the waveform is locked when the set is tuned to 7.3MHz.

A : B = 0.46V : 0.84V
(reference)



oscilloscope



RT602

FM SECTION 1

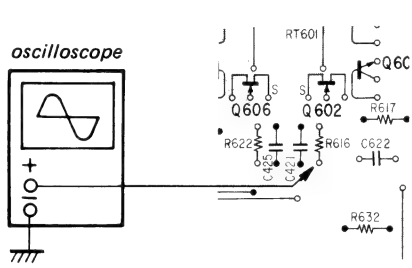
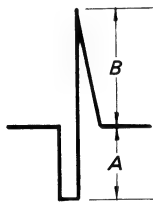
Setting:
Band Selector: FM

FM rf Stereo Signal	FM rf Monaural Signal
Carrier frequency: 98MHz Modulation: Audio 400Hz, 33.75kHz deviation (45%) Subchannel 38kHz 33.75kHz deviation (45%) Pilot 19kHz 7.5kHz deviation (10%)	Carrier frequency: 98MHz Modulation: 1kHz, 75kHz deviation (100%)

FM/MW PLL Bias Adjustment

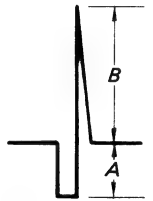
1. Connect the oscilloscope as shown on the right.
2. Set BAND selector switch (S1) to FM.
3. Push TUNING (+, -) button for 87.5MHz.
4. Adjust RT601 so that the waveform is shown below.

A : B = 2.0 : more than 3.0
A is approx. 0.4V



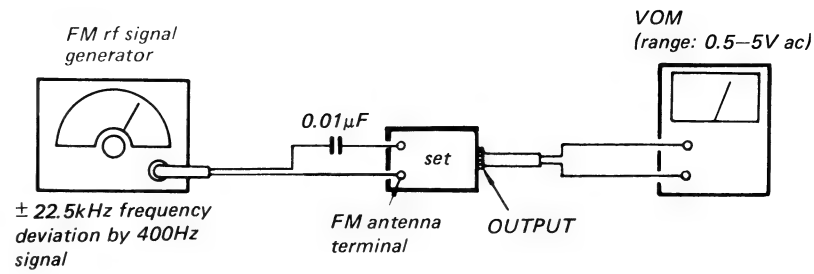
5. Push the button for 108MHz. Confirm that the waveform is locked as shown below.

A : B = 1.5 : 3.5
A is approx. 0.3V



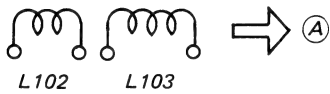
6. Set BAND selector switch (S1) to MW. Confirm that the waveform is locked when the set is tuned to 522kHz.
7. Confirm that the waveform is locked when the set is tuned to 1,602kHz.

FM Tracking Adjustment

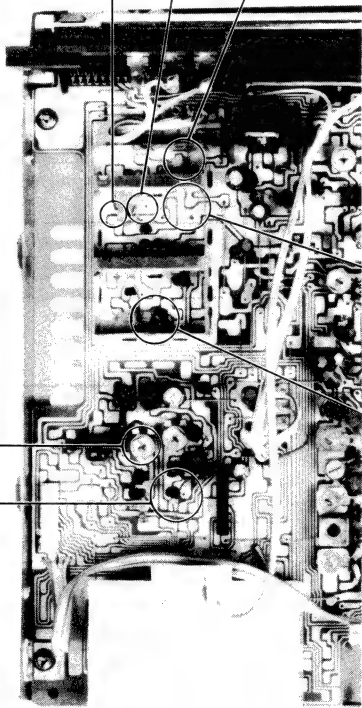


1. Push TUNING (+, -) button for 98MHz.
2. Approach L102 and L103 not to contact each other.
3. Adjust L101 and L103, and repeat the adjustment 2-3 times for maximum VOM reading.

(Adjust L103 in the direction as shown by arrow A).

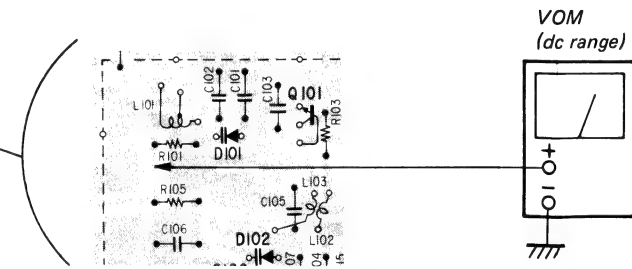


L102 L103 L101



FM OSC Voltage Adjustment

Push TUNING (+, -) button for 108MHz. Adjust L105 for 8.9 - 9V VOM reading.

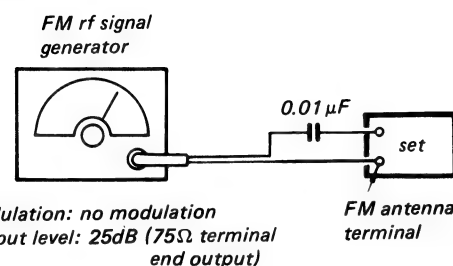


L105

FM SECTION 2

TUNED Indicator Adjustment

Setting:



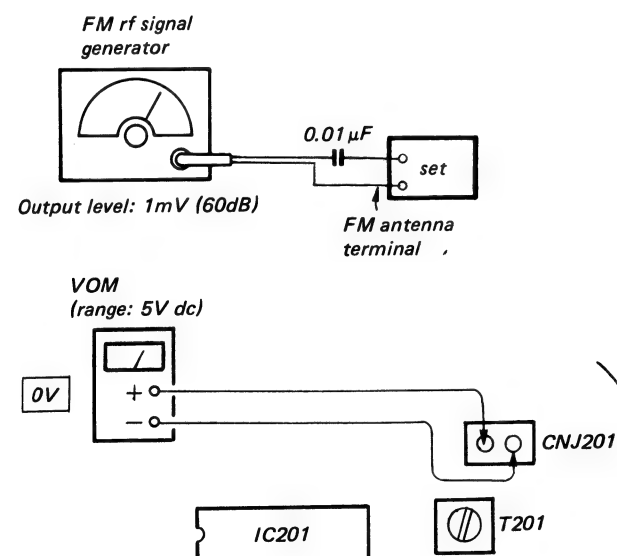
Procedure:

Adjust RT201 so that TUNED indicator (D201) lights up.

RT201

FM Discriminator Adjustment

Setting:



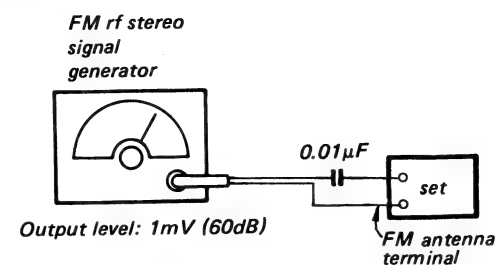
Procedure:

Push TUNING (+, -) button for 98MHz. Adjust T201 for 0V VOM reading.

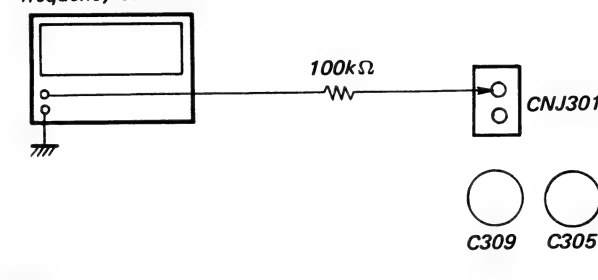
T201

VCO Adjustment

Setting:



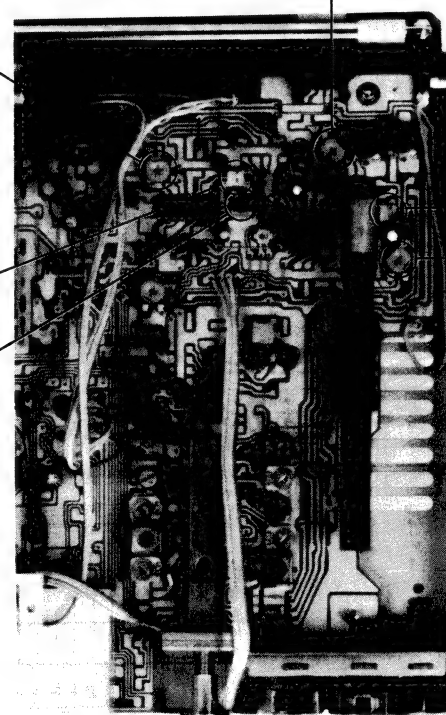
frequency counter



Procedure:

Adjust RT302 so that the frequency counter indicates 19kHz ±50Hz.

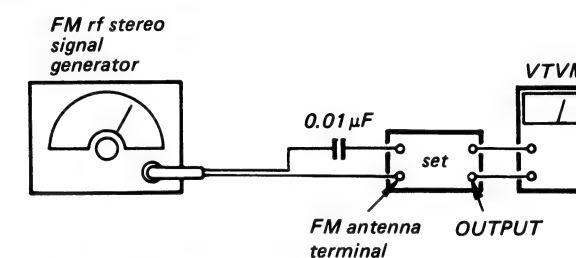
RT302



RT301

FM Stereo Separation Adjustment

Procedure:



Carrier frequency: 98MHz
Output level: 1mV (60dB)
Modulation:
Audio (400Hz): 33.75kHz deviation (45%)
Pilot (19kHz): 7.5kHz deviation (10%)
Sub-channel: 33.75kHz deviation (45%)

FM stereo signal generator output channel	VTVM connection	VTVM reading (dB)
L-CH	L-CH	(A)
R-CH	L-CH	(B) Adjust RT301 for minimum reading.
R-CH	R-CH	(C)
L-CH	R-CH	(D) Adjust RT301 for minimum reading.

L-CH Stereo separation: (A) - (B)
R-CH Stereo separation: (C) - (D)

The separations of both channels should be equal.

3-1. MOUNTING DIAGRAM

SECTION 3
DIAGRAMSFH-7
ST-78SFH-7
ST-78S

Q, IC	D
202	204
	303
	202
	203
501	
101	501,101
503	502
IC201	504
IC301	502
	505
	102
203	102
	201
201,104	302
103	301
	402
	103
IC401	
609	508,507
	609,608,607
	610
605	503
608,604	506
607,603	
606,602	
IC601	
601	
	604,602
	603,605
	401-A
	401-B
IC602	
	405,404,403
Q, IC	D

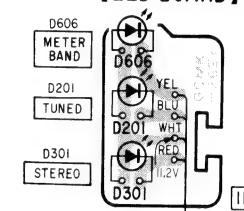
Note:

- : part mounted on the conductor side.
- : indicates side identified with part number.
- : B + pattern
- : signal path
- : L-CH signal path
- : R-CH signal path

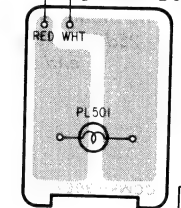
[TUNER BOARD]



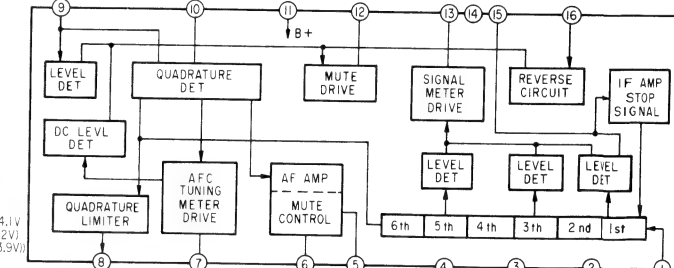
[LED BOARD]



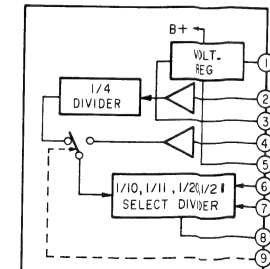
[LAMP BOARD]



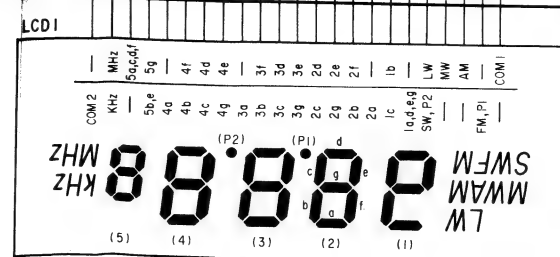
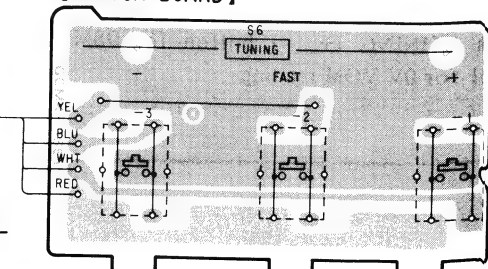
IC201 LA1231N



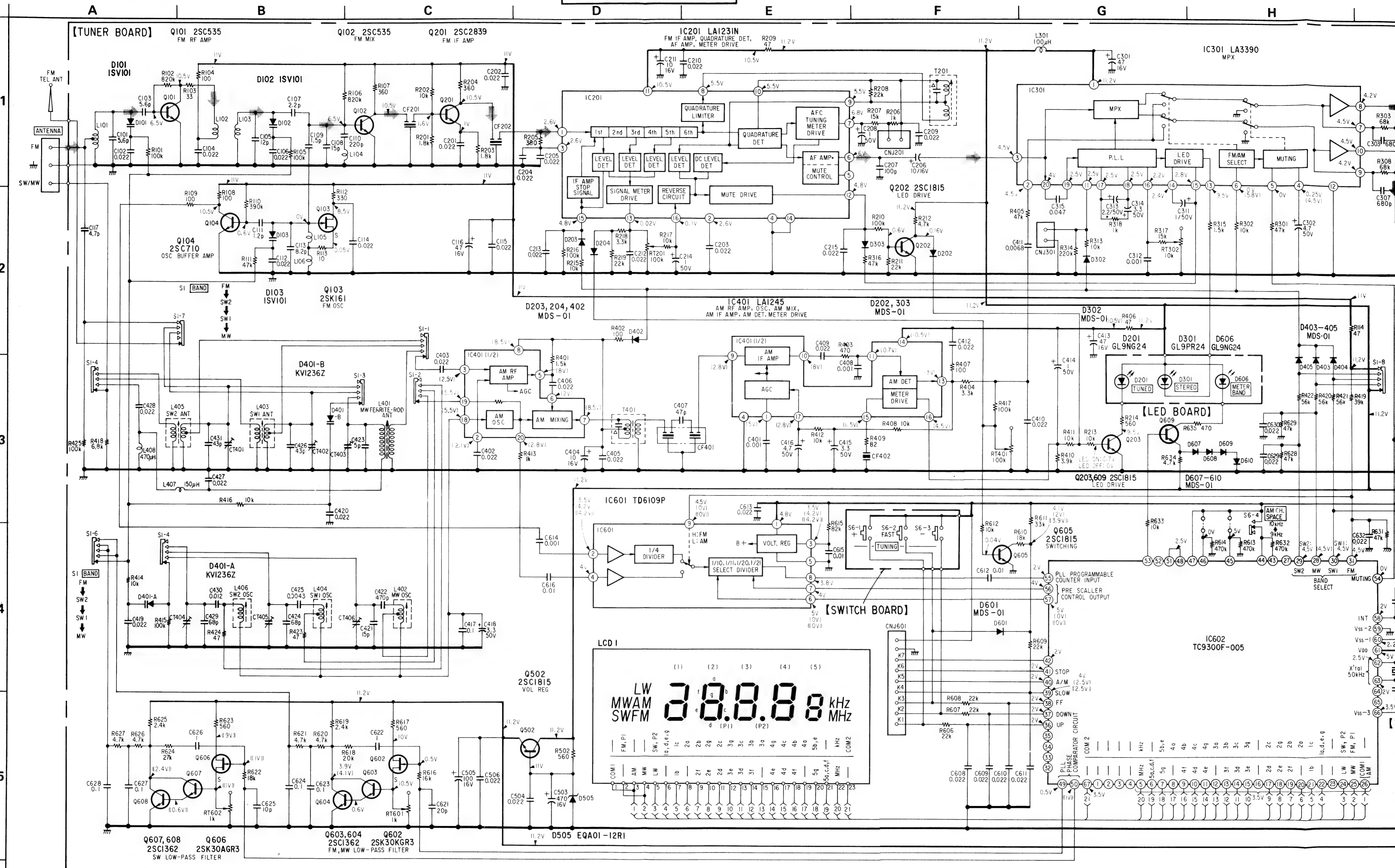
IC601 TD6109P

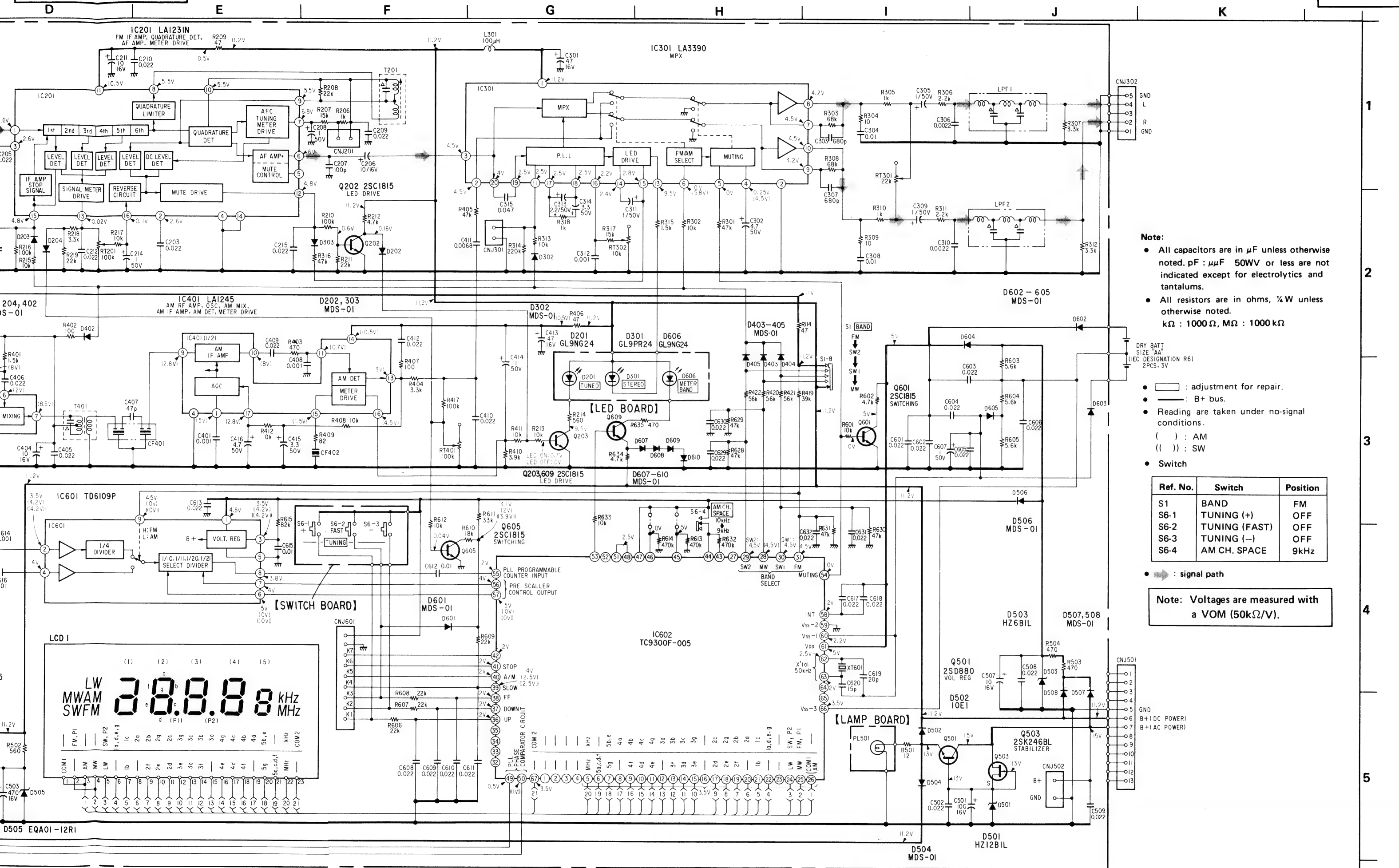


[SWITCH BOARD]



FH-7
ST-78S

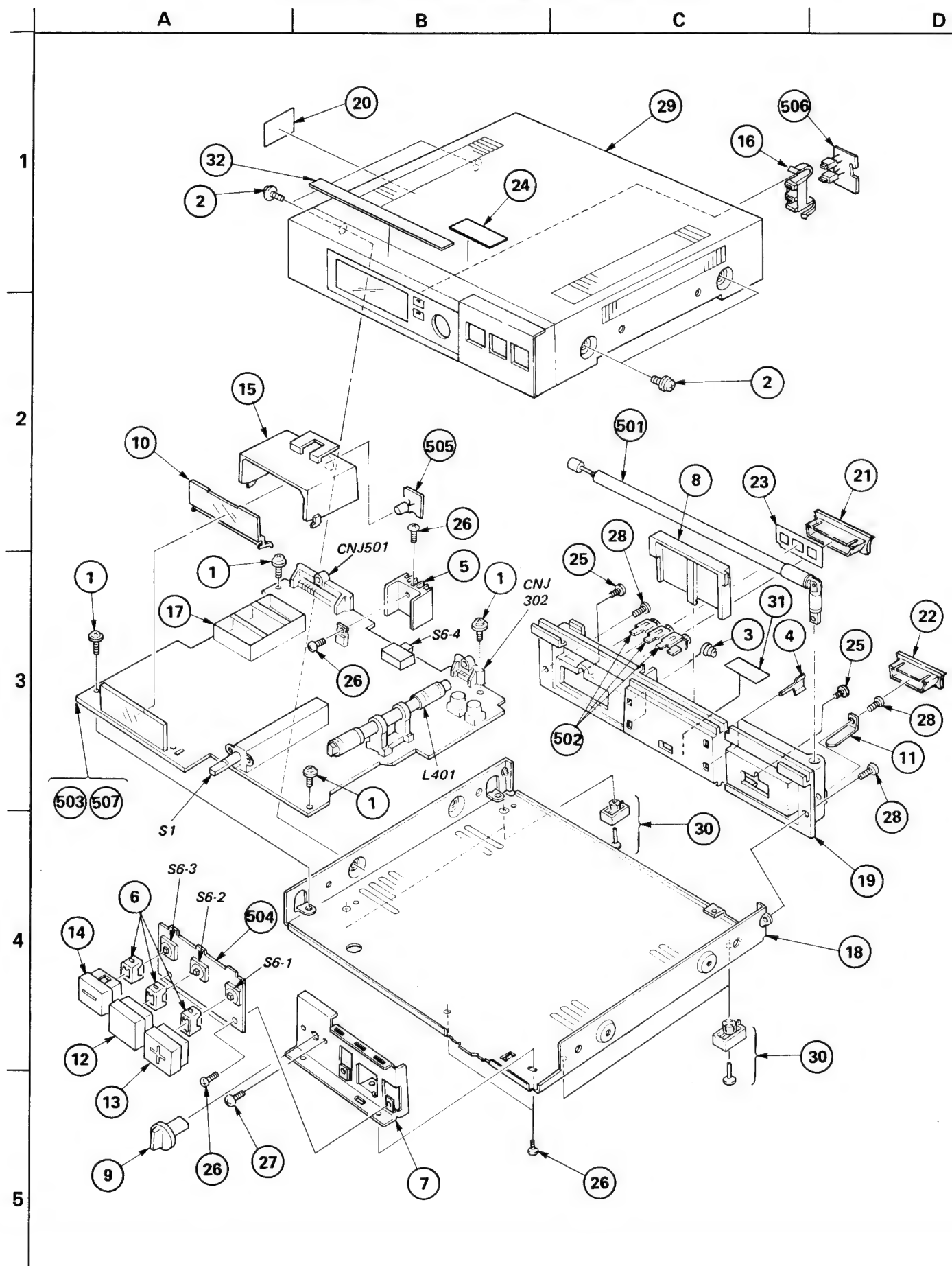




SECTION 4 EXPLODED VIEW AND PARTS LIST

FH-7
ST-78S

FH-7
ST-78S



GENERAL SECTION

No.	Part No.	Description
1	3-701-589-00	SCREW, SELF-TAPPING
2	3-703-354-00	SCREW, CASE, CLAW
3	3-883-424-00	SPRING
4	3-883-428-00	PLATE, TERMINAL (POSITIVE)
5	4-863-132-00	HEAT SINK (SMALL)
6	4-881-725-00	RING (TACT), FLEXIBLE
7	4-884-844-00	CHASSIS, SUB
8	4-884-845-00	LID, BATTERY CASE
9	4-884-847-00	KNOB, ROTARY SWITCH
10	4-884-848-00	ILLUMINATOR
11	4-884-850-00	LUG, ANTENNA
12	4-884-852-00	KNOB (16X16), SQUARE (FAST)
13	4-884-853-00	KNOB (16X16), SQUARE (+)
14	4-884-854-00	KNOB (16X16), SQUARE (-)
15	4-884-856-00	HOUSE, LAMP
16	4-884-857-00	HOLDER, LED
17	4-884-858-00	PLATE, SHIELD
18	4-884-859-00	CHASSIS
19	4-884-860-01	PLATE, JACK
20	4-884-872-00	LABEL, MODEL NUMBER
21	4-884-874-00	COVER, CONNECTOR (A)
22	4-884-876-00	COVER, CONNECTOR (B)
23	4-884-915-00	LABEL, ANTENNA
24	4-884-927-00	LABEL (SYSTEM), CAUTION
25	7-685-547-19	SCREW +BTP 3X10 TYPE2 N-S
26	7-685-871-01	SCREW +BVTT 3X6 (S)
27	7-685-871-09	SCREW +BVTT 3X6 (S)
28	7-685-872-09	SCREW +BVTT 3X8 (S)
29	A-4322-460-A	CASE ASSY, PANEL
30	X-4884-801-0	FOOT ASSY, RUBBER
31	4-866-752-00	LABEL (A), SWITCH
32	4-884-873-00	SEAL, INDICATION, METER BAND

ELECTRICAL PARTS

Ref.No.	Part No.	Description
501	1-501-270-00	ANTENNA, TELESCOPIC
502	1-536-742-00	TERMINAL BOARD, ANTENNA
503	1-608-558-00	PC BOARD, TUNER
504	1-608-559-00	PC BOARD, SWITCH
505	1-608-560-00	PC BOARD, LAMP
506	1-608-561-00	PC BOARD, LED
507	A-4351-324-A	MOUNTED PCB, TUNER
C312	1-104-077-00	POLYSTYRENE 0.001MF 5% 50V
C421	1-102-880-00	CERAMIC 15PF 5% 50V
C422	1-104-069-00	POLYSTYRENE 470PF 5% 50V
C423	1-101-997-00	CERAMIC 5PF 0.5PF 50V
C424	1-102-676-00	CERAMIC 68PF 5% 50V
C425	1-104-092-00	POLYSTYRENE 0.0043MF 5% 50V
C426	1-102-674-00	CERAMIC 43PF 5% 50V
C429	1-102-860-00	CERAMIC 68PF 5% 50V
C431	1-102-727-00	CERAMIC 43PF 5% 50V
C622	1-130-644-00	FILM 1MF 5% 50V
C623	1-130-632-00	FILM 0.1MF 5% 50V
C624	1-130-632-00	FILM 0.1MF 5% 50V
C626	1-130-644-00	FILM 1MF 5% 50V
C627	1-130-632-00	FILM 0.1MF 5% 50V
C628	1-130-632-00	FILM 0.1MF 5% 50V
CF201	1-527-968-71	FILTER, CERAMIC
CF202	1-527-968-71	FILTER, CERAMIC
CF401	1-527-937-00	FILTER, CERAMIC
CF402	1-527-981-00	FILTER, CERAMIC
●CNJ201;1-560-060-00		PIN, CONNECTOR 2P
●CNJ301;1-560-060-00		PIN, CONNECTOR 2P
●CNJ302 1-562-067-00		SOCKET, CONNECTOR 5P
●CNJ501 1-562-068-00		SOCKET, CONNECTOR 13P
●CNJ502;1-535-115-00		TERMINAL
●CNJ601;1-560-339-00		PIN, CONNECTOR 9P
●CNJ602;1-535-116-00		TERMINAL
CT401	1-141-181-11	CAP, TRIMMER
CT402	1-141-181-11	CAP, TRIMMER
CT403	1-141-180-00	CAP, TRIMMER 15P
CT404	1-141-181-11	CAP, TRIMMER
CT405	1-141-181-11	CAP, TRIMMER
CT406	1-141-180-00	CAP, TRIMMER 15P
D101	8-719-800-09	DIODE 1SV101
D102	8-719-800-09	DIODE 1SV101
D103	8-719-800-09	DIODE 1SV101
D201	8-719-903-07	DIODE GL-9NG24
D203	8-719-815-55	DIODE 1S1555
D204	8-719-815-55	DIODE 1S1555

NOTE:

- Items with no part number and no description are not stocked because they are seldom required for routine service.
- Items marked "●" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- Due to standardization, parts with part numbers (Δ-ΔΔΔ-ΔΔΔ-XX or Δ-ΔΔΔΔ-ΔΔΔ-X) may be different from those used in the set.

CAPACITORS:

- All capacitors are in μF. Common capacitors are omitted. Refer to the following lists for their part numbers.
- MF: μF, PF: μF.

RESISTORS

- All resistors are in ohms. Common 1/4W, 1/8W and 1/16W carbon resistors are omitted. Refer to the following lists for their part numbers.
- F: nonflammable

COILS

- MMH: mH, UH: μH

SEMICONDUCTORS

- In each case, U: μ, for example: UA...: μA..., UPA...: μPA..., UPC...: μPC, UPD...: μPD...

ELECTRICAL PARTS

Ref.No.	Part No.	Description
D301	8-719-903-11	DIODE GL-9PR24
D302	8-719-815-55	DIODE 1S1555
D303	8-719-815-55	DIODE 1S1555
D401	8-719-902-79	DIODE KV1236Z2
D402	8-719-815-55	DIODE 1S1555
D403	8-719-815-55	DIODE 1S1555
D404	8-719-815-55	DIODE 1S1555
D405	8-719-815-55	DIODE 1S1555
D501	8-719-910-24	DIODE HZ12B1L
D502	8-719-200-02	DIODE 10E-2
D503	8-719-910-64	DIODE HZ6B1L
D504	8-719-815-55	DIODE 1S1555
D505	8-719-991-21	DIODE EQA01-12R1
D506	8-719-815-55	DIODE 1S1555
D507	8-719-815-55	DIODE 1S1555
D508	8-719-815-55	DIODE 1S1555
D601	8-719-815-55	DIODE 1S1555
D602	8-719-815-55	DIODE 1S1555
D603	8-719-815-55	DIODE 1S1555
D604	8-719-815-55	DIODE 1S1555
D605	8-719-815-55	DIODE 1S1555
D606	8-719-903-07	DIODE GL-9NG24
D607	8-719-815-55	DIODE 1S1555
D608	8-719-815-55	DIODE 1S1555
D609	8-719-815-55	DIODE 1S1555
D610	8-719-815-55	DIODE 1S1555
IC201	8-759-812-31	IC LA1231
IC301	8-759-833-90	IC LA3390
IC401	8-759-812-45	IC LA1245
IC601	8-759-201-03	IC TD6109P
IC602	8-759-201-02	IC TC9300F005
L101	▲;1-422-093-00	COIL, AIR-CORE
L102	▲;1-422-094-00	COIL, AIR-CORE
L103	▲;1-422-096-00	COIL, AIR-CORE
L104	▲;1-422-039-00	COIL, AIR-CORE
L105	▲;1-422-098-00	COIL, AIR-CORE
L106	▲;1-422-099-00	COIL, AIR-CORE
L301	1-408-421-21	MICRO INDUCTOR 100UH
L401	1-402-001-00	ANTENNA, FERRITE-ROD (MW)
L402	1-406-033-00	COIL (OSC)
L403	1-401-998-00	COIL (ANT)
L404	1-406-035-00	COIL (OSC)
L405	1-401-999-00	COIL (ANT)
L406	1-406-036-00	COIL (OSC)
L407	1-408-423-21	MICRO INDUCTOR 150UH
L408	1-408-429-21	MICRO INDUCTOR 470UH

NOTE:

- Items with no part number and no description are not stocked because they are seldom required for routine service.
- Items marked "▲" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- Due to standardization, parts with part numbers (▲-▲▲▲-▲▲▲-XX or ▲-▲▲▲▲-▲▲▲-X) may be different from those used in the set.

CAPACITORS:

- All capacitors are in μF . Common capacitors are omitted. Refer to the following lists for their part numbers.
MF: μF , PF: μpF .

RESISTORS

- All resistors are in ohms. Common 1/4W, 1/8W and 1/16W carbon resistors are omitted. Refer to the following lists for their part numbers.
- F : nonflammable

COILS

- MMH : mH, UH : μH

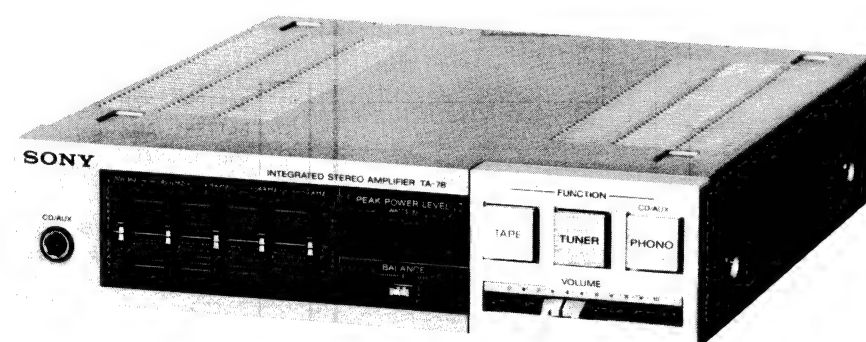
ELECTRICAL PARTS

Ref.No.	Part No.	Description
LCD1	1-806-544-00	DISPLAY PANEL, LIQUID CRYSTAL
LPF1	1-235-164-00	FILTER, LOW PASS
LPF2	1-235-164-00	FILTER, LOW PASS
PL501	1-518-511-00	LAMP, PILOT
Q101	8-729-353-52	TRANSISTOR 2SC535
Q102	8-729-353-52	TRANSISTOR 2SC535
Q103	8-729-216-13	TRANSISTOR 2SK161
Q104	8-729-671-14	TRANSISTOR 2SC710-14
Q201	8-729-883-92	TRANSISTOR 2SC2839
Q202	8-729-663-47	TRANSISTOR 2SC1364
Q203	8-729-663-47	TRANSISTOR 2SC1364
Q501	8-729-288-02	TRANSISTOR 2SD880
Q502	8-729-663-47	TRANSISTOR 2SC1364
Q503	8-729-224-63	TRANSISTOR 2SK246-BL
Q601	8-729-663-47	TRANSISTOR 2SC1364
Q602	8-729-203-05	TRANSISTOR 2SK30A-GR3
Q603	8-729-665-47	TRANSISTOR 2SC1362
Q604	8-729-665-47	TRANSISTOR 2SC1362
Q605	8-729-663-47	TRANSISTOR 2SC1364
Q606	8-729-203-05	TRANSISTOR 2SK30A-GR3
Q607	8-729-665-47	TRANSISTOR 2SC1362
Q608	8-729-665-47	TRANSISTOR 2SC1362
Q609	8-729-663-47	TRANSISTOR 2SC1364
RT201	1-226-854-41	RES, ADJ, CARBON 100K
RT301	1-226-852-41	RES, ADJ, CARBON 22K
RT302	1-226-851-41	RES, ADJ, CARBON 10K
RT401	1-226-853-41	RES, ADJ, CARBON 47K
RT601	1-226-847-00	RES, ADJ, CARBON 1K
RT602	1-226-847-00	RES, ADJ, CARBON 1K
S1	1-554-267-00	SWITCH, ROTARY SLIDE
S6-1	1-552-412-00	SWITCH, KEY BOARD
S6-2	1-552-412-00	SWITCH, KEY BOARD
S6-3	1-552-412-00	SWITCH, KEY BOARD
S6-4	1-553-510-00	SWITCH, SLIDE
T201	1-404-419-00	COIL, DISCRIMINATOR
T401	1-404-413-00	TRANSFORMER, IF
XT601	1-527-995-00	VIBRATOR, CRYSTAL

SEMICONDUCTORS

- In each case, U : μ , for example:
UA.... : μA ..., UPA.... : μPA ..., UPC.... : μPC ,
UPD.... : μPD ...

INTEGRATED STEREO AMPLIFIER [TA-78]



Note: TA-78 is an integrated stereo amplifier in FH-7.

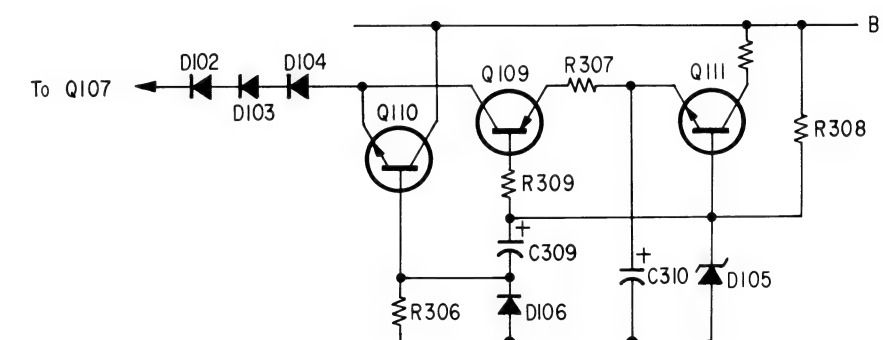
1. CIRCUIT DESCRIPTION

MUTING CIRCUIT

Q107 is a muting transistor.
It mutes output when the power switch is turned on and off or power voltage is much decreased.
When the power switch is ON:
Current flows on R308, C309 and R306, when the power switch is turned on.
Q110 is on until C309 finishes charging.
Q107 mutes output while Q110 is on.
When the power switch is off.
When Q109 base voltage is 0.6V lower than that of the emitter, Q109 is on.
Voltage charged to C310 is discharged through R307.
Then, Q107 turns on.

Power voltage fluctuation.

D105 is an 11V zener diode. Therefore, Q111 base voltage is 11V.
At this time, Q111 emitter voltage is 10.4V.
When power voltage decreases, and Q109 base voltage becomes 0.6V lower than that of the emitter, Q109 turns on.
Then Q107 mutes output.
When power voltage increased a little, Q110 turns ON.
Then Q107 turns ON and mutes output.



Graphic EQ circuit

Fig. 1 shows a part of graphic EQ circuit redrawn for easy comprehension.
Graphic EQ circuit consists of C1, 2, R1, 2, Q1.
The output level of frequency band decreases when S1 is set to side ①, because certain frequency band of input signal passes through EQ circuit to the ground.

The output level of frequency band increases when S1 is set to side ②, because NF circuit is connected to the EQ circuit causing certain frequency band to pass through the EQ circuit to the ground.
The frequency band of this EQ circuit can be changed by changing the value of a capacitor.

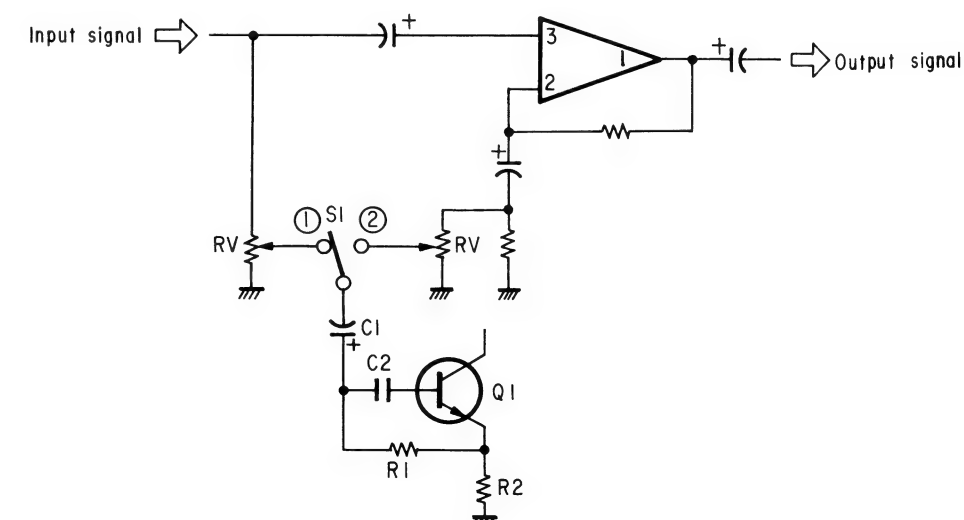
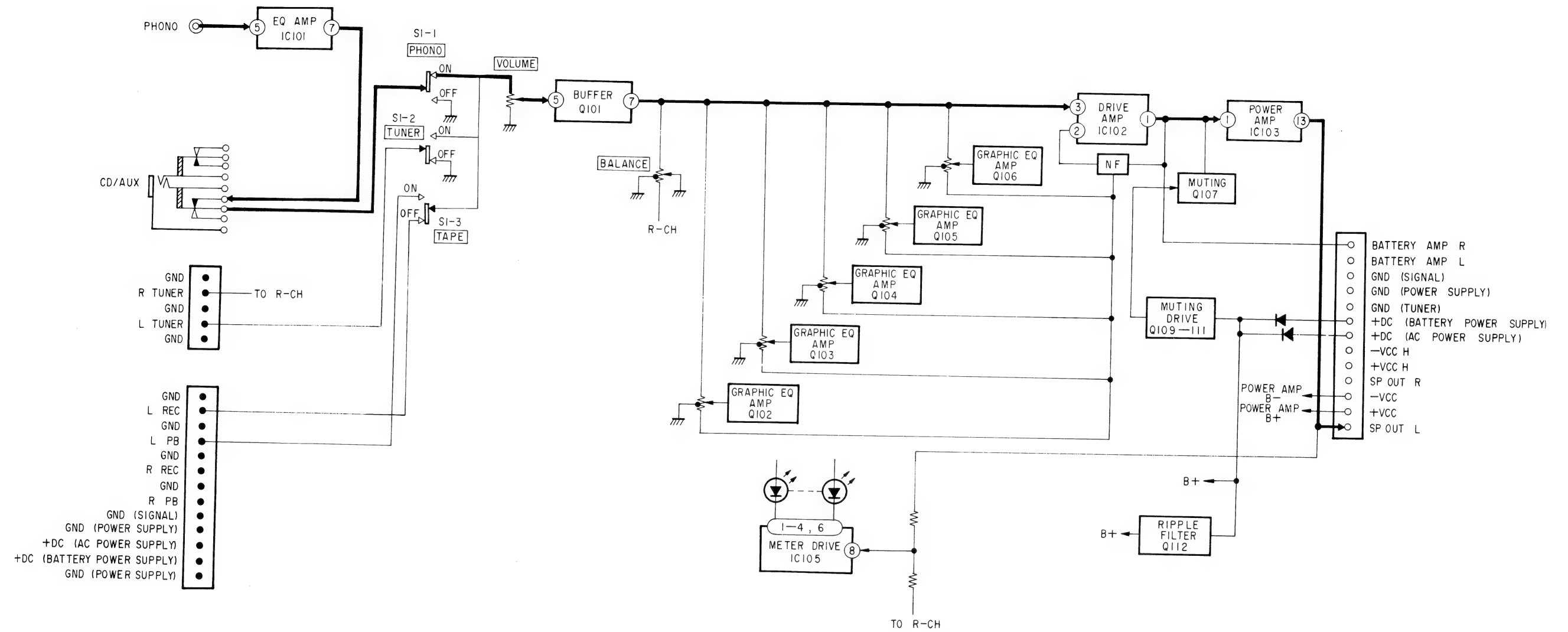


Fig. 1



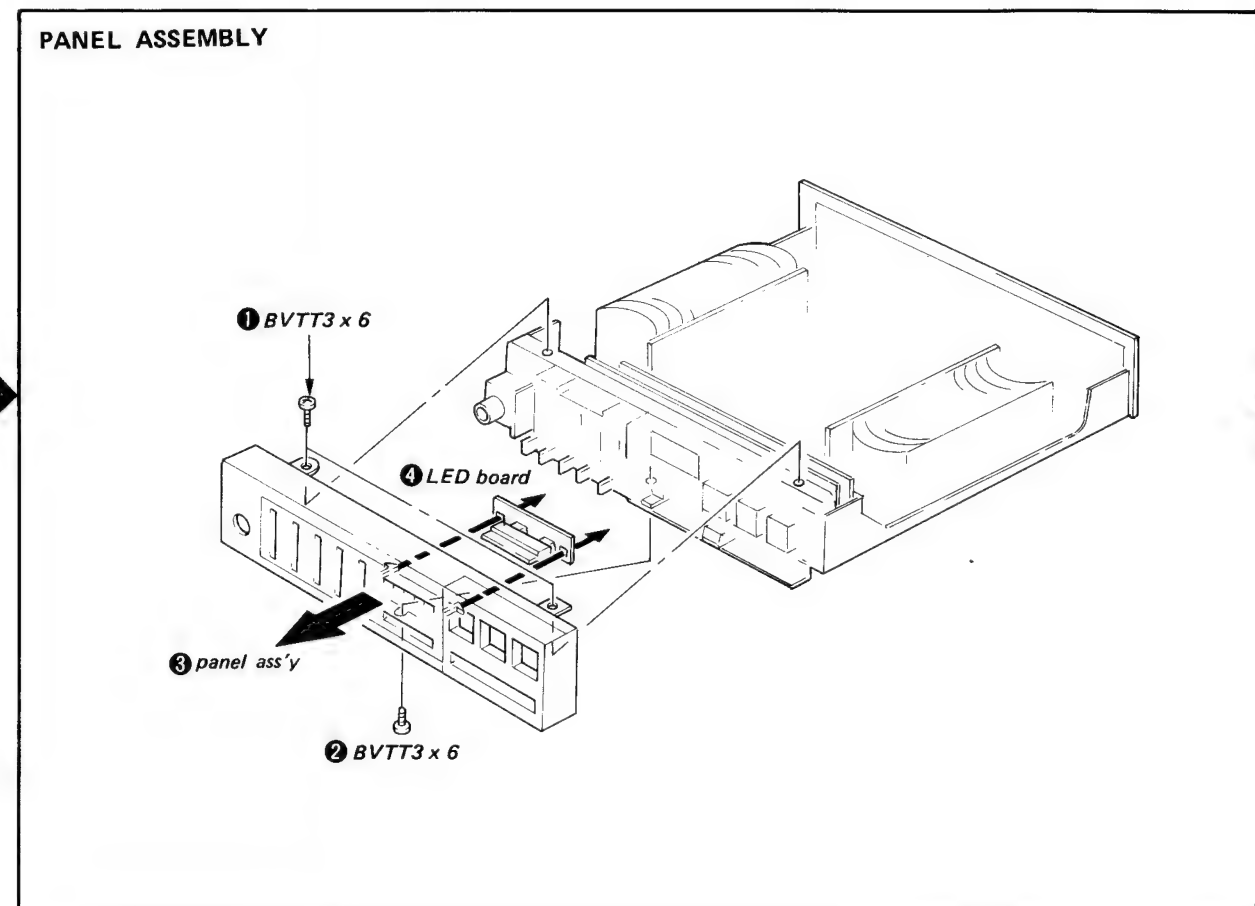
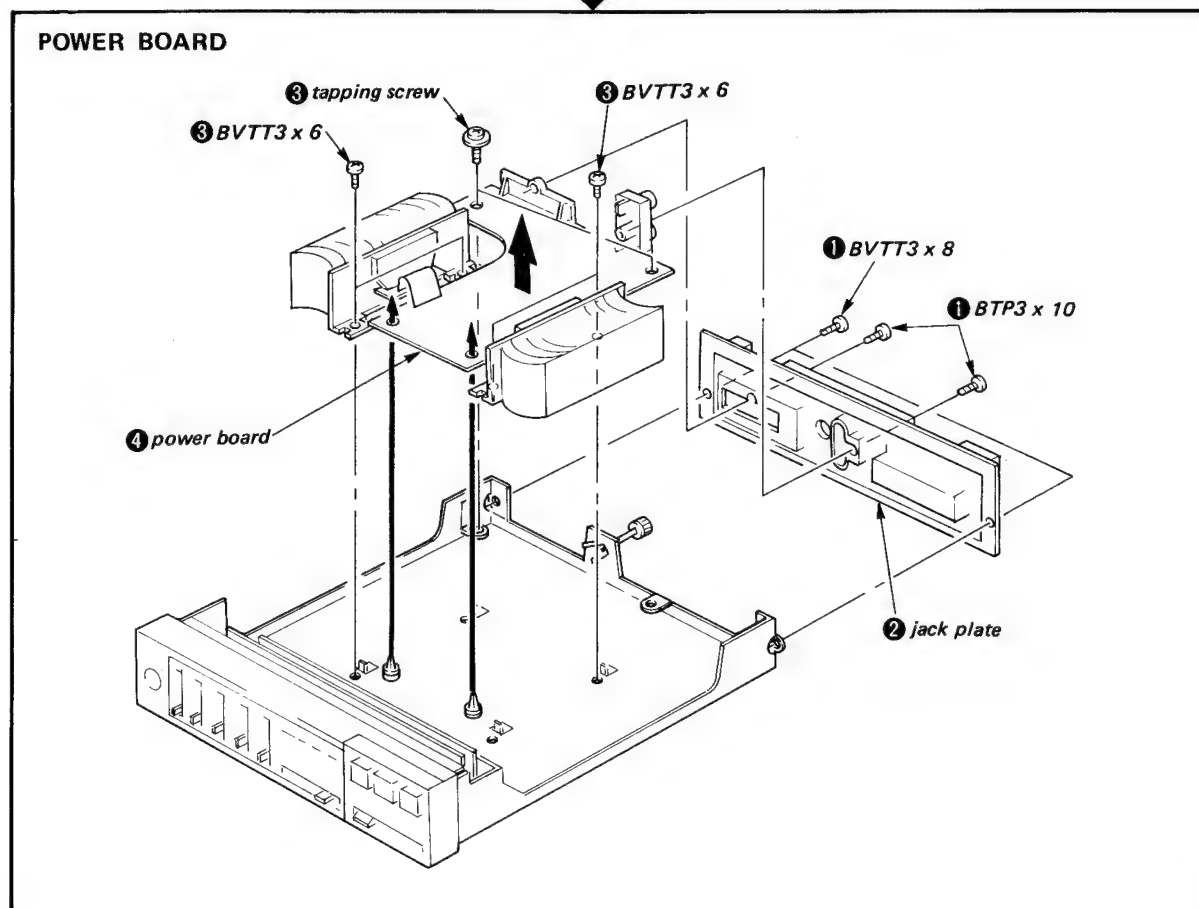
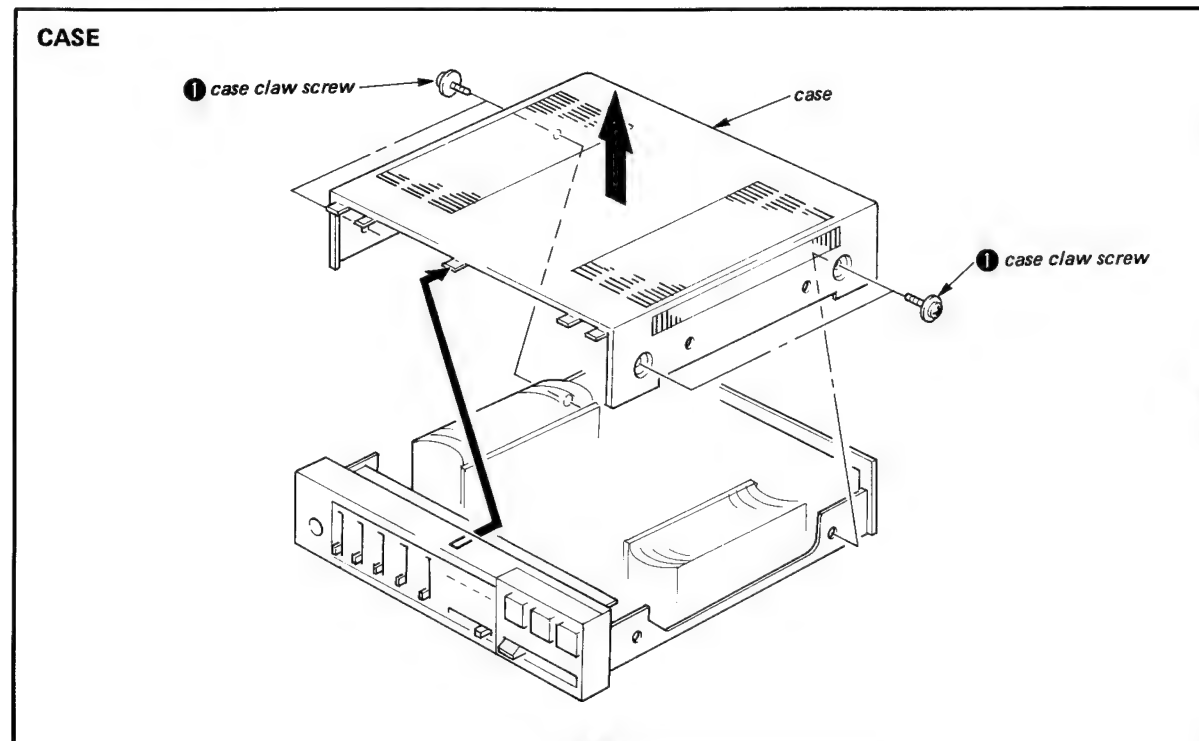
SONY® SERVICE MANUAL

2. BLOCK DIAGRAM

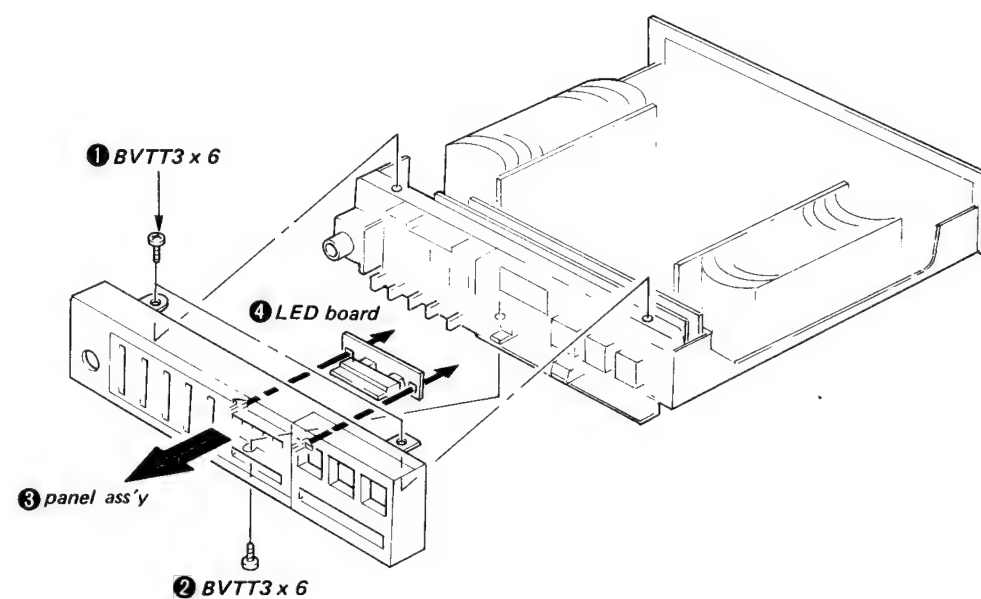


3. DISASSEMBLY

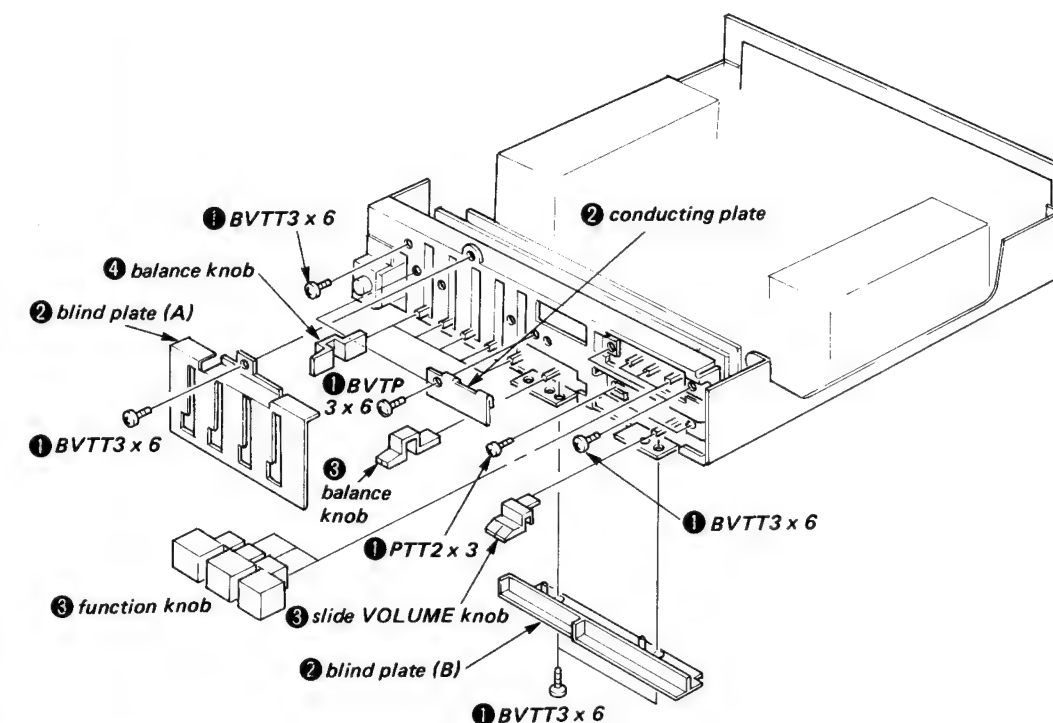
Note: Follow the disassembly procedure in the numerical order given.



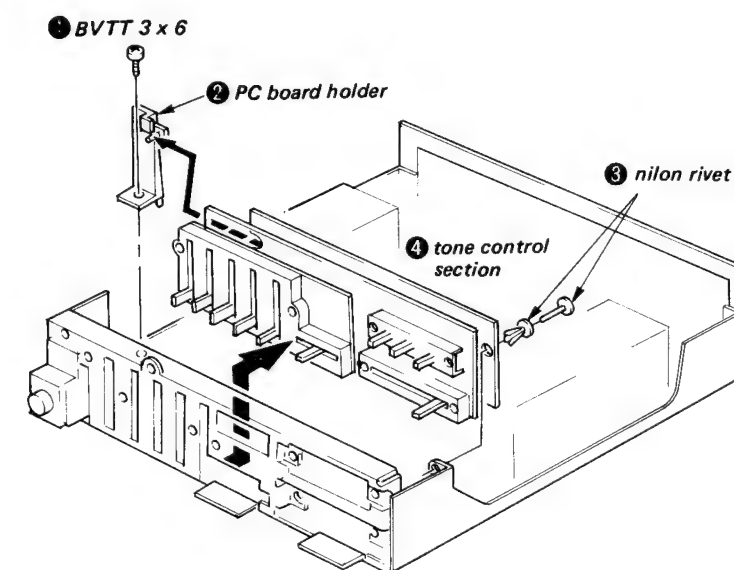
PANEL ASSEMBLY



TONE CONTROL SECTION (1)



TONE CONTROL SECTION (2)



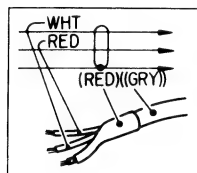
CAUTION ON VOLTAGE MEASUREMENT

When measuring voltages, be careful not to short the pins 9 and 10, 12 and 13 of CNJ1 in order to prevent IC103 from break-down.

		down.		B	C	D	E	F	G	H				
Q		111			110	112			152	153	154	155	156	
IC	IC104	109	108		IC105	107	IC103			102	103	104	105	106
D		105	106	104	103	102	107	108						
		110					101							
		109	111											
			112											

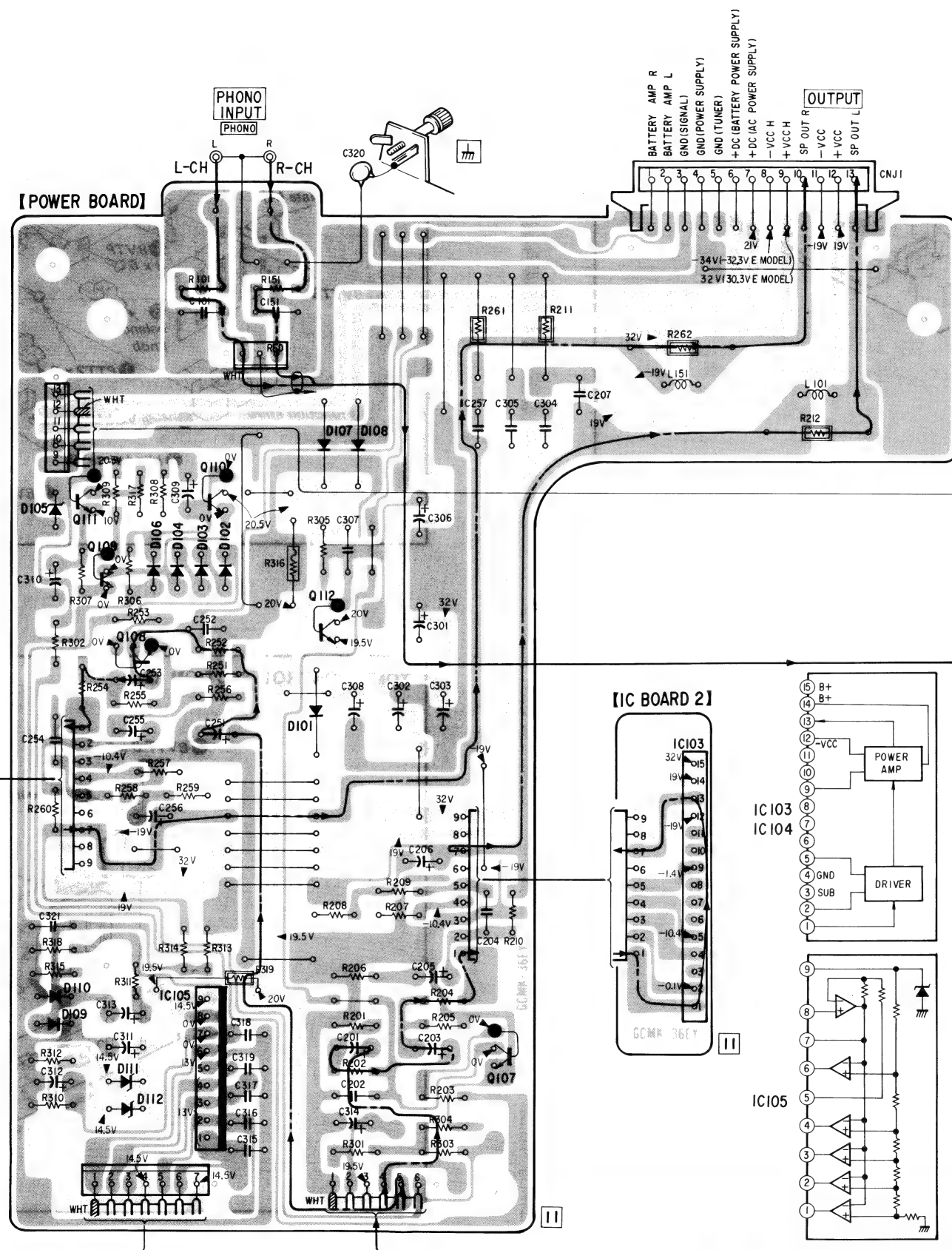
Note:

- Color code of sleeving over the end of the jacket.

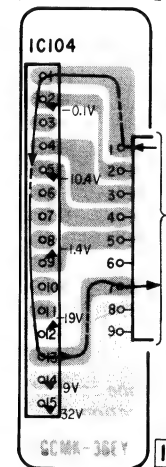


- : parts extracted from the component side.
- : parts extracted from the conductor side.
- : B+ pattern

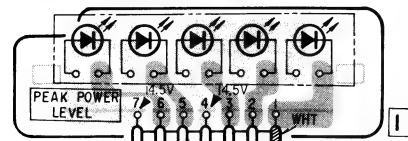
- : signal path
- : L-CH signal path
- : R-CH signal path



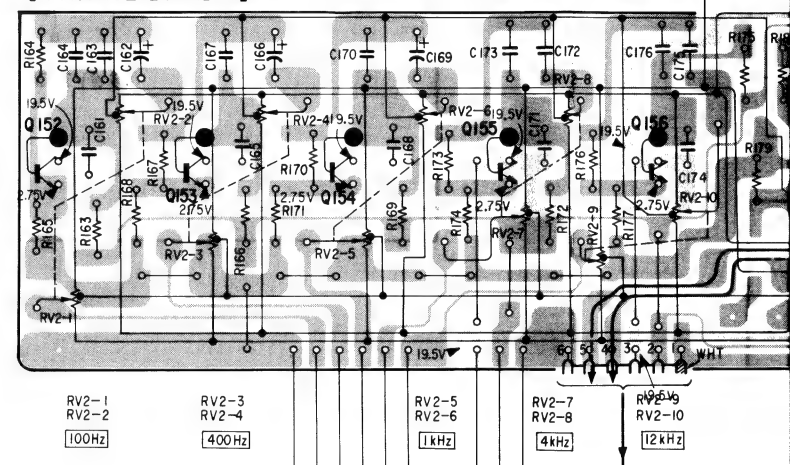
[IC BOARD 1]



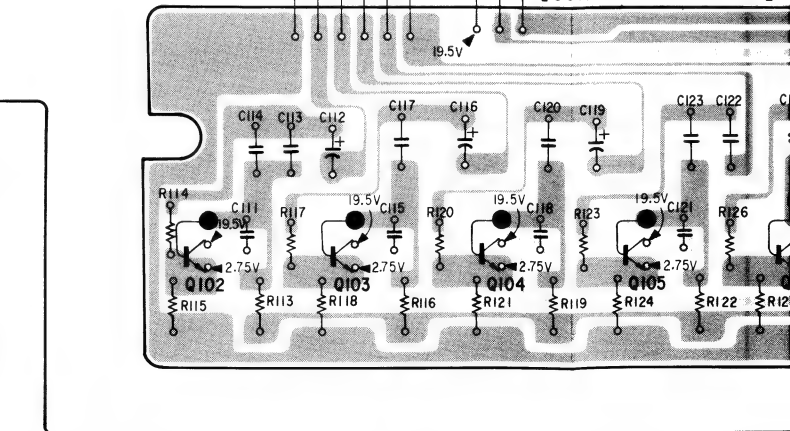
[LED BOARD]



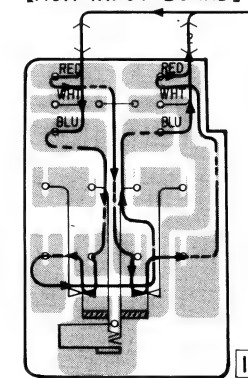
[CONTROL BOARD A]



[CONTROL BOARD B]



[AUX INPUT BOARD]

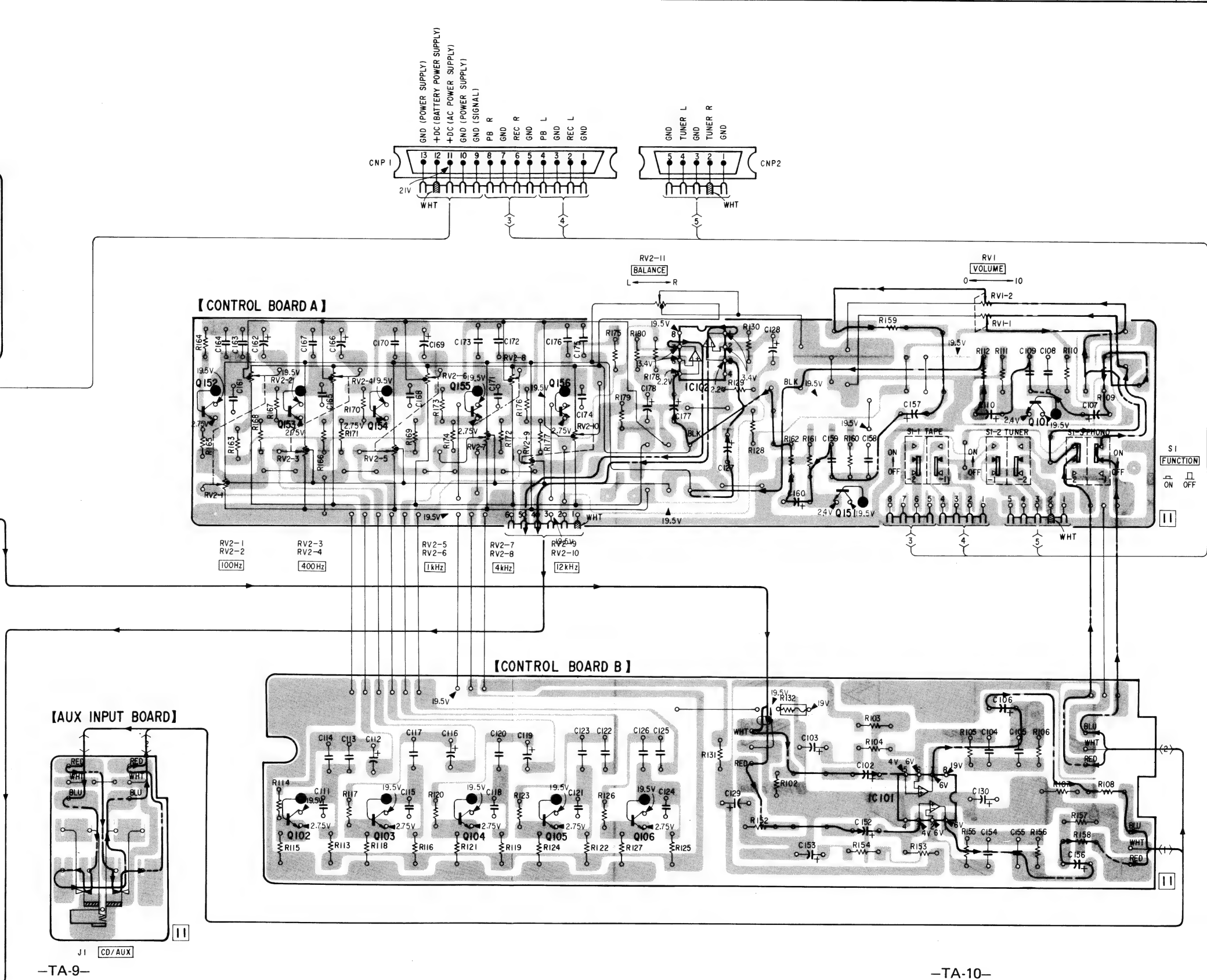
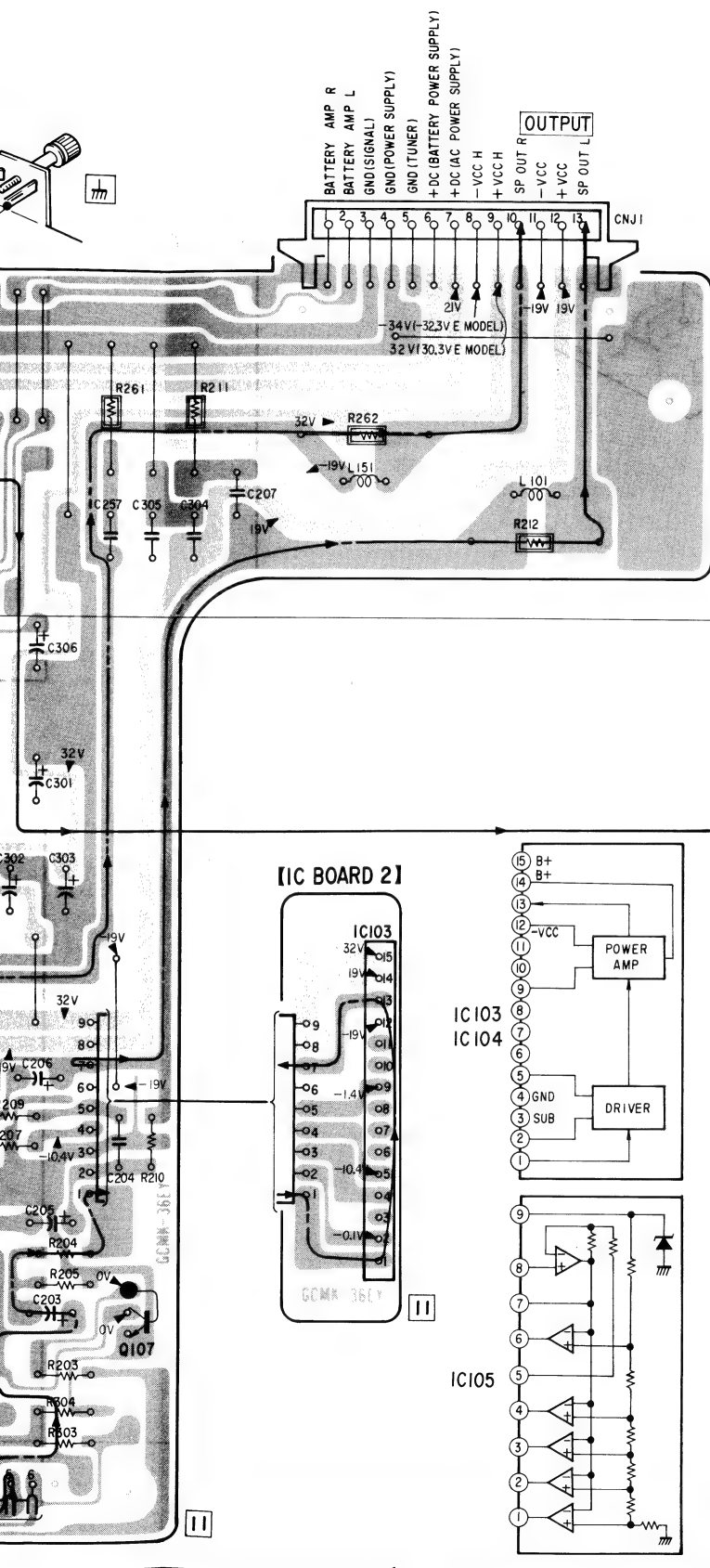


s 9 and
break-

FH-7
TA-78

FH-7
TA-78

D	E	F	G	H	I	J	K	L			
107	IC103	152	153	154	155	156	IC102	151	IC101	101	Q IC D
1											



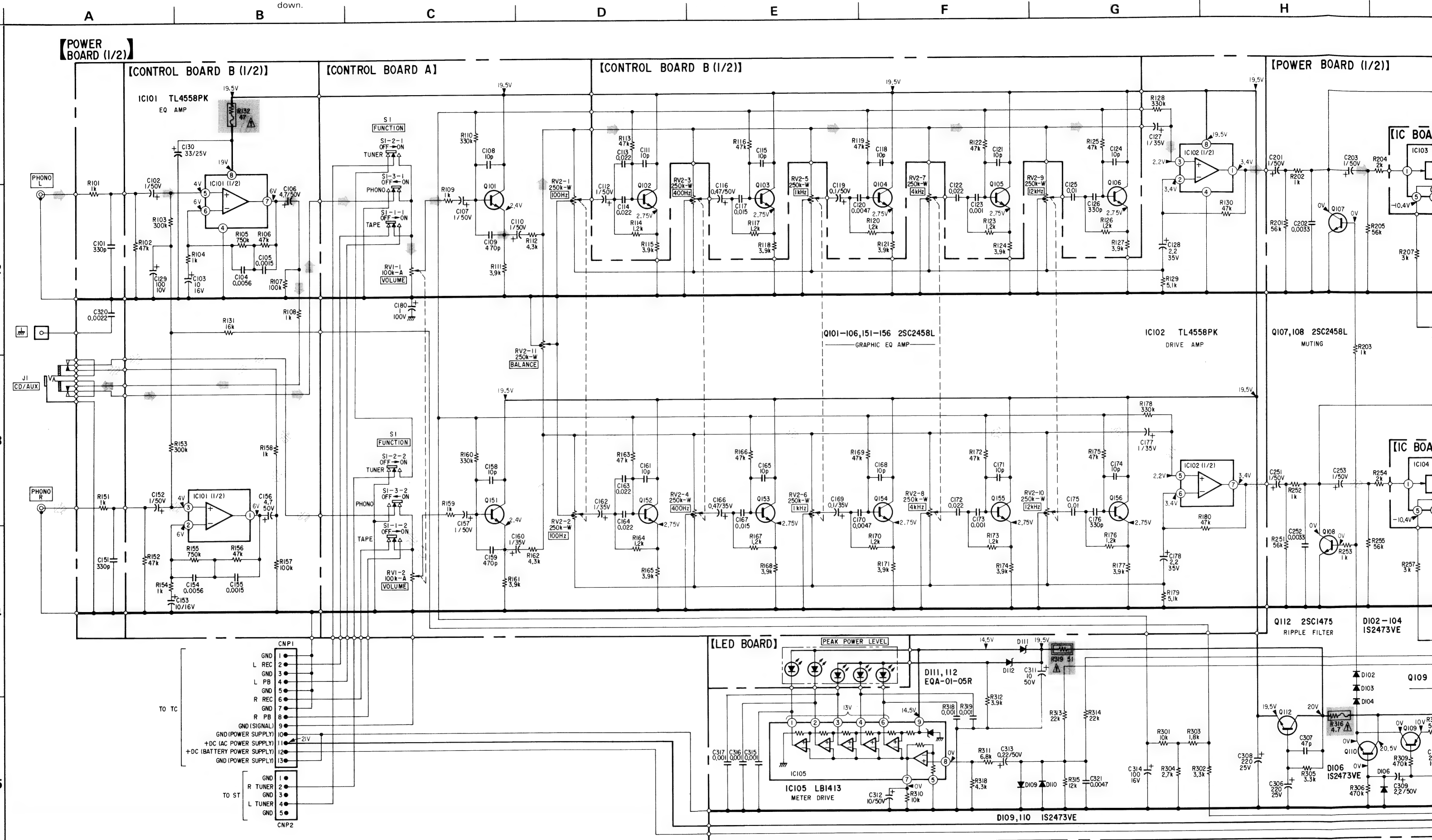
-TA-9-

-TA-10-

5. SCHEMATIC DIAGRAM

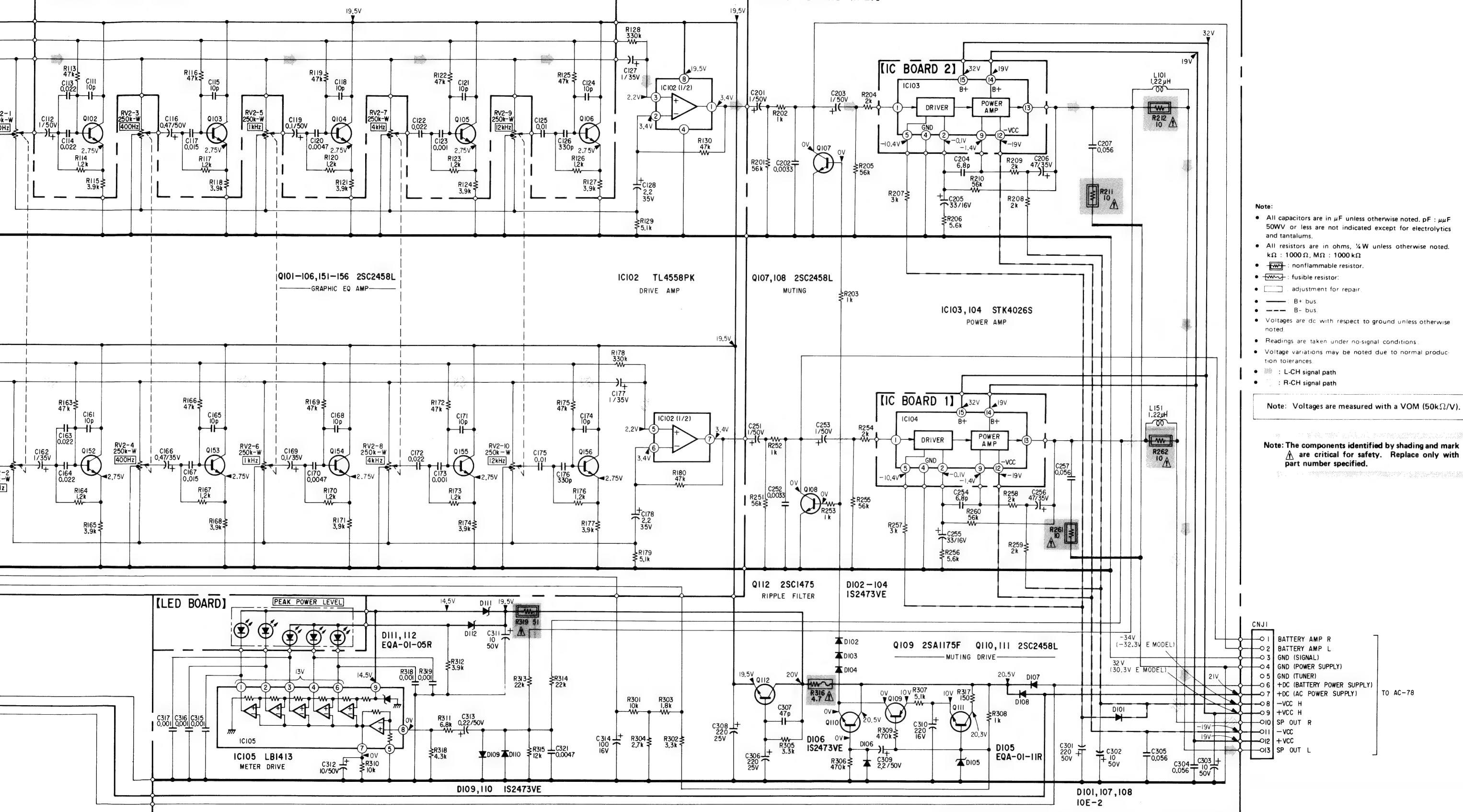
CAUTION ON VOLTAGE MEASUREMENT

When measuring voltages, be careful not to short the pins 9 and 10, 12 and 13 of CNJ1 in order to prevent IC103 from break-down.

FH-7
TA-78FH-7
TA-78

[CONTROL BOARD B (1/2)]

[POWER BOARD (1/2)]

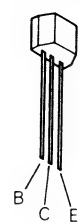
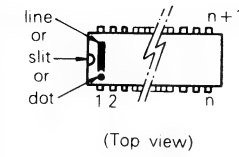
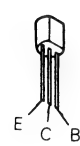
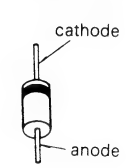
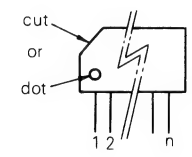
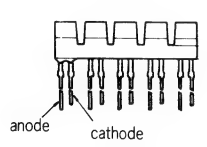
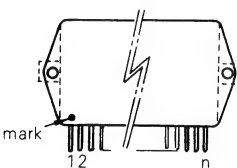


Note:

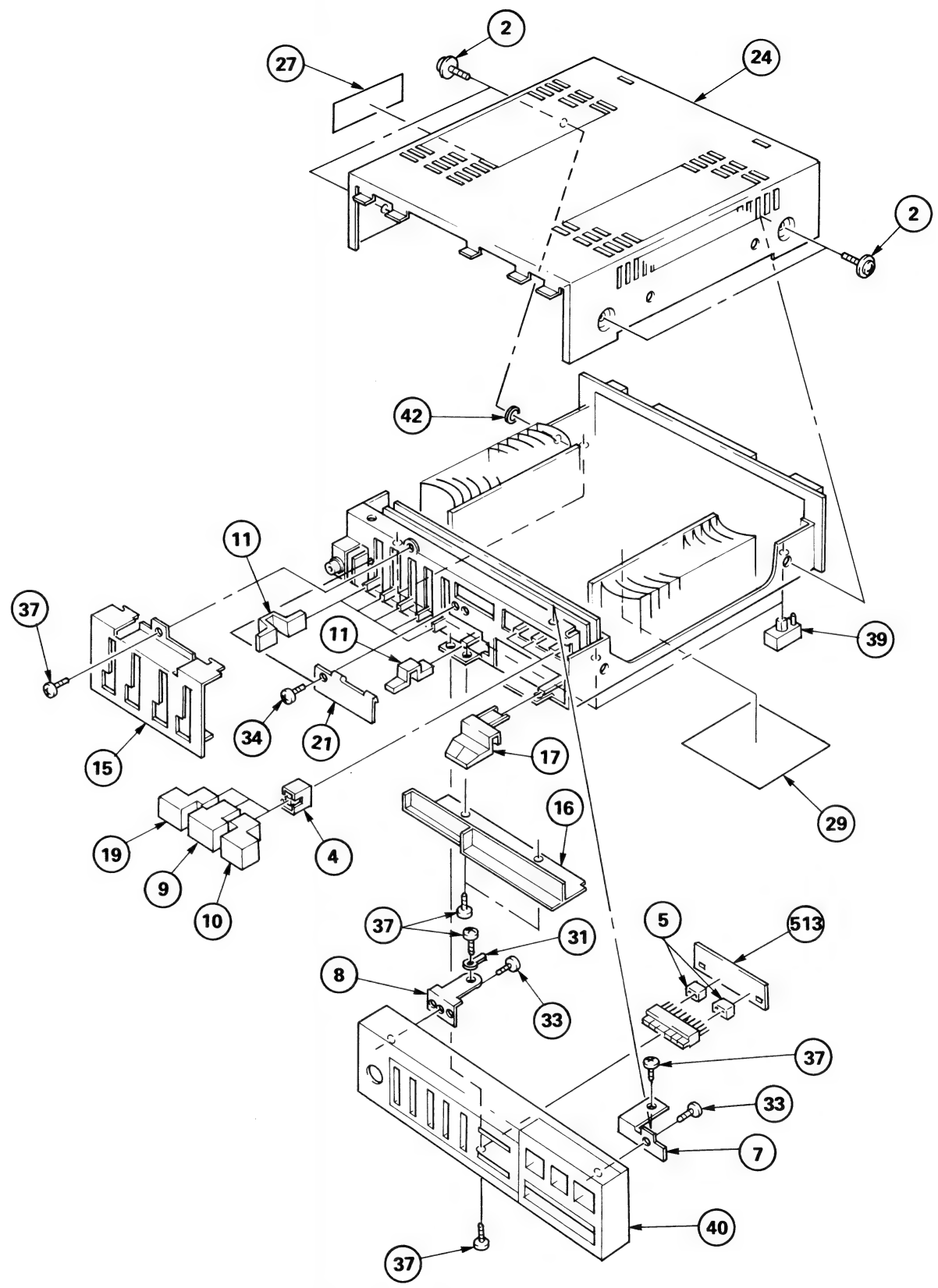
- All capacitors are in μF unless otherwise noted. $\text{pF} : \mu\text{F}$ 50WV or less are not indicated except for electrolytics and tantalums.
- All resistors are in ohms, $\frac{1}{4}\text{W}$ unless otherwise noted. $\text{k}\Omega : 1000\Omega$, $\text{M}\Omega : 1000\text{k}\Omega$.
- nonflammable resistor.
- adjustment for repair.
- B+ bus.
- B- bus.
- Voltages are dc with respect to ground unless otherwise noted.
- Readings are taken under no-signal conditions.
- Voltage variations may be noted due to normal production tolerances.
- L-CH signal path.
- R-CH signal path.

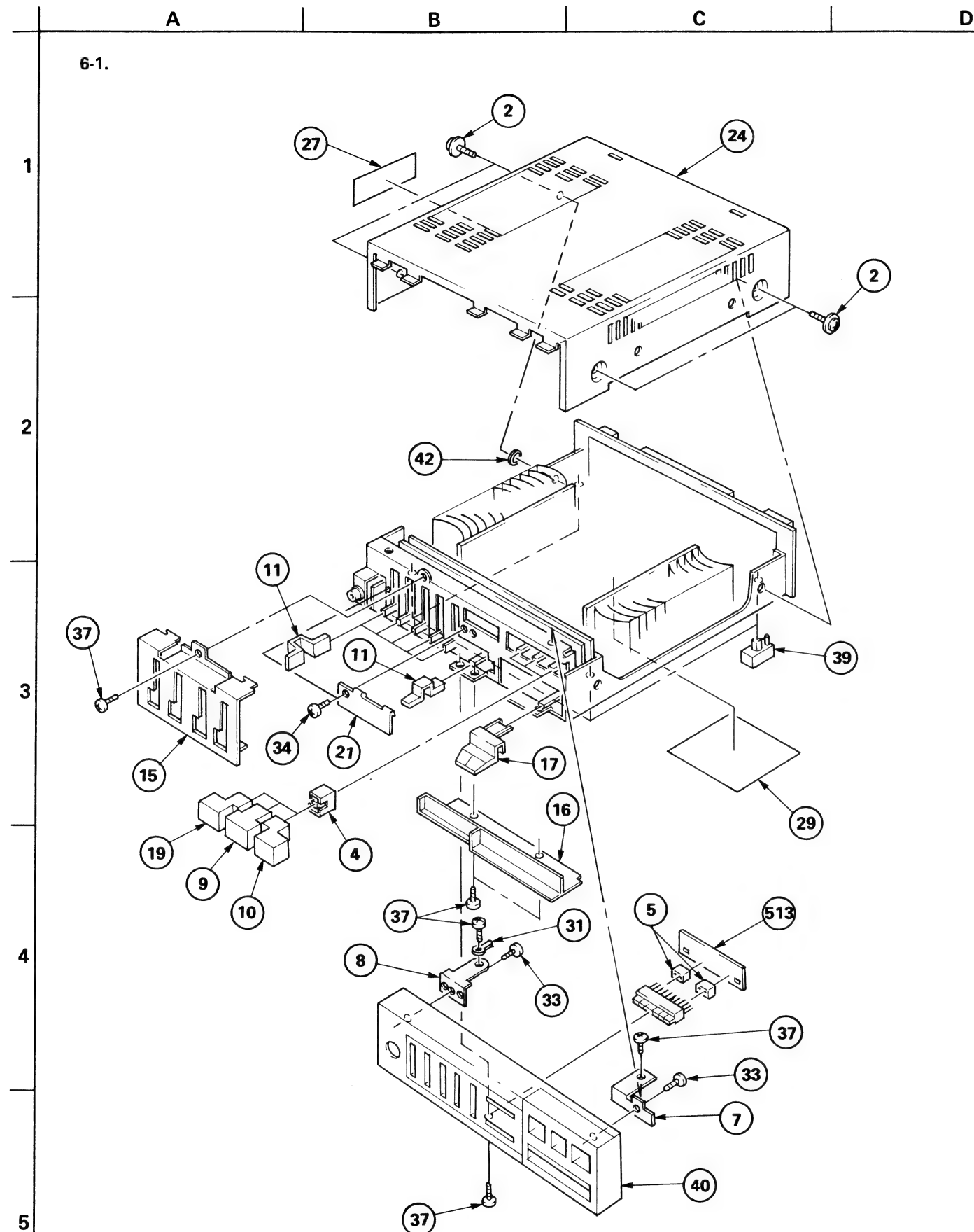
Note: Voltages are measured with a VOM (50k Ω/V).Note: The components identified by shading and mark Δ are critical for safety. Replace only with part number specified.

SEMICONDUCTOR LEAD LAYOUTS

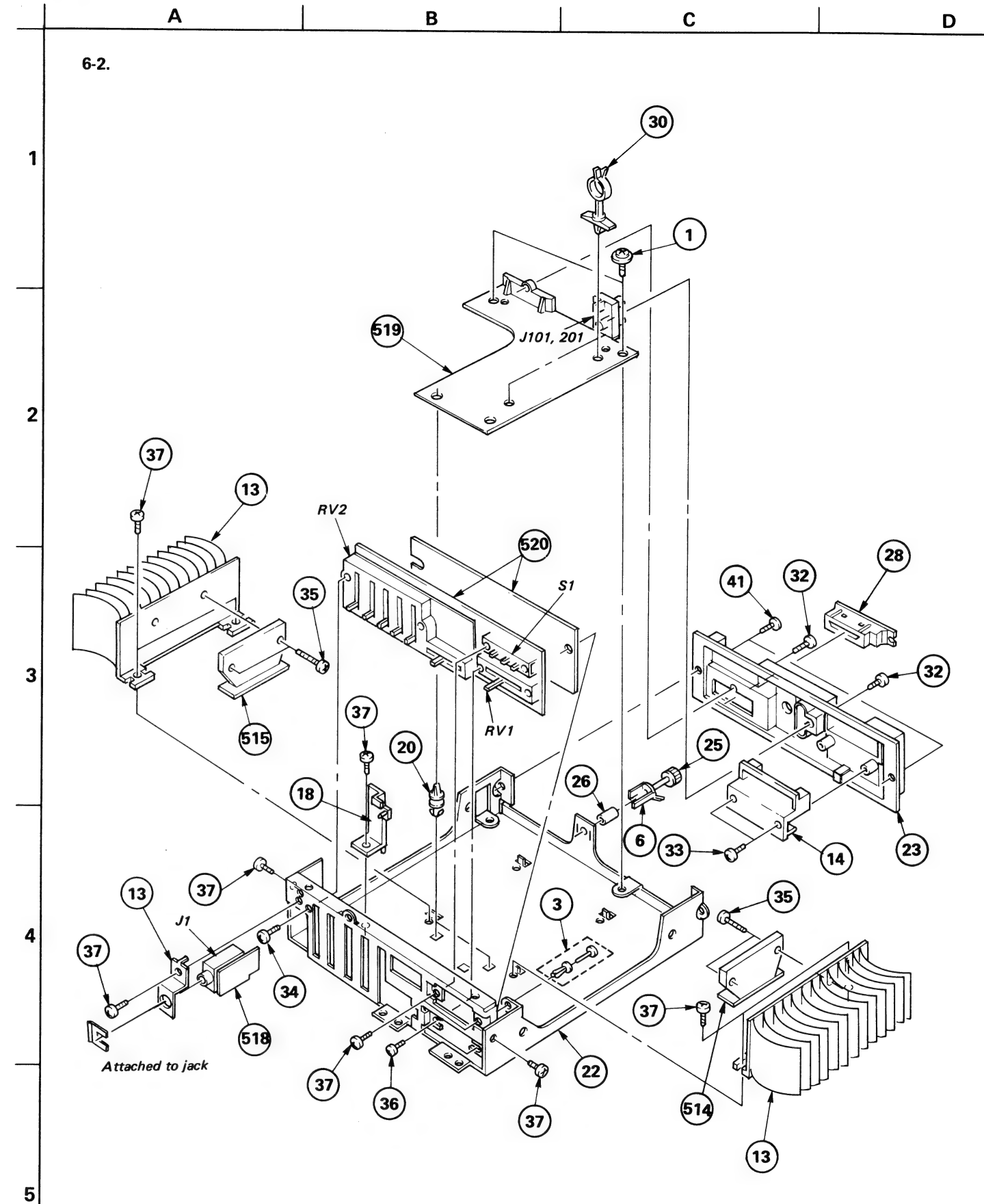
<p>2SA1048 2SC2458</p> 	<p>TL4558PK</p>  <p>(Top view)</p>
<p>2SC1345 2SC1475</p> 	<p>1S1555 10E2 EQA01-05R EQA01-11R EQB01-11Z</p> 
<p>LB1413</p> 	<p>SLP252B-06</p> 
<p>STK4026S</p>  <p>(Marking side view)</p>	

6. EXPLODED VIEWS AND PARTS LIST

	A	B	C	D	
6-1.					6-2.
1					1
2					2
3					3
4					4
5					5



-TA-15-



-TA-16-

GENERAL SECTION

No.	Part No.	Description
1	3-701-589-00	SCREW, SELF-TAPPING
2	3-703-354-11	SCREW (OS), CASE, CLAW
3	4-812-134-00	RIVET NYLON, 3.5
4	4-864-307-00	RING
5	4-881-653-00	SPACER, LED
6	4-884-817-00	WASHER, TERMINAL
7	4-884-819-00	BRACKET (A)
8	4-884-820-00	BRACKET (B)
9	4-884-821-00	KNOB (16X16) (TUNER), SQUARE
10	4-884-822-00	KNOB (16X16) (PHONO), SQUARE
11	4-884-823-00	KNOB, BALANCE
12	4-884-824-00	BRACKET, H.P
13	4-884-825-00	HEAT SINK
14	4-884-826-00	HOLDER (A), WIRE
15	4-884-827-00	PLATE (A), BLIND
16	4-884-828-00	PLATE (B), BLIND
17	4-884-829-00	KNOB, SLIDE VOLUME
18	4-884-830-00	HOLDER (C), PC BOARD
19	4-884-831-00	KNOB (16X16) (TAPE), SQUARE
20	4-884-834-00	SUPPORT, PC
21	4-884-835-00	PLATE, CONDUCTING
22	4-884-839-00	CHASSIS
23	4-884-840-00	PLATE, JACK
24	4-884-841-00	CASE
25	4-884-862-00	SCREW, GROUND
26	4-884-863-00	COLLAR
27	4-884-870-00	LABEL
28	4-884-874-00	COVER, CONNECTOR (A)
29	4-884-877-00	LABEL (PC BOARD REMOVAL)
30	4-884-882-00	CLAMP
31	7-623-508-01	LUG, 3
32	7-685-547-19	SCREW +BTP 3X10 TYPE2 N-S
33	7-685-646-11	SCREW +BVT 3X8 TYPE2 N-S
34	7-685-645-11	SCREW +BVTP 3X6 TYPE2 SLIT
35	7-685-650-21	SCREW +BVTP 3X16 TYPE2 SLIT
36	7-685-780-01	SCREW +PTT 2X3 (S)
37	7-685-871-01	SCREW +BVTT 3X6 (S)
38	7-685-872-09	SCREW +BVTT 3X8 (S)
39	X-4884-801-0	FOOT ASSY, RUBBER
40	X-4884-811-2	PANEL ASSY
41	7-685-871-09	SCREW +BVTT 3X6
42	4-830-092-00	WASHER 4φ

ELECTRICAL PARTS

Ref.No.	Part No.	Description
501	1-535-422-00	PLATE, JUMPER
502	1-535-424-00	PLATE, JUMPER
503	1-552-067-00	SOCKET CONNECTOR 5P
504	1-535-426-00	PLATE, JUMPER
505	1-556-475-00	CORD (WITH CONNECTOR) 13P
506	1-556-476-00	CORD (WITH CONNECTOR) 5P
507	1-561-439-00	SOCKET, CONNECTOR 3P
508	1-561-441-00	SOCKET, CONNECTOR 5P
509	1-561-442-00	SOCKET, CONNECTOR 6P
510	1-561-443-00	SOCKET, CONNECTOR 7P
511	1-562-068-00	SOCKET, CONNECTOR 13P
512	1-608-440-00	PC BOARD, POWER
513	1-608-441-00	PC BOARD, LED
514	1-608-442-00	PC BOARD, IC (1)
515	1-608-443-00	PC BOARD, IC (2)
516	1-608-450-00	PC BOARD, CONTROL (A)
517	1-608-451-00	PC BOARD, CONTROL (B)
518	1-608-452-00	PC BOARD, AUX INPUT
519	A-4351-327-A	MOUNTED PCB, POWER
520	A-4375-167-A	MOUNTED PCB, CONTROL
D101	8-719-200-02	DIODE 10E-2
D102	8-719-815-55	DIODE 1S1555
D103	8-719-815-55	DIODE 1S1555
D104	8-719-815-55	DIODE 1S1555
D105	8-719-930-11	DIODE EQB01-11Z
D106	8-719-815-55	DIODE 1S1555
D107	8-719-200-02	DIODE 10E-2
D108	8-719-200-02	DIODE 10E-2
D109	8-719-815-55	DIODE 1S1555
D110	8-719-815-55	DIODE 1S1555
D111	8-719-936-05	DIODE EQA01-05R
D112	8-719-936-05	DIODE EQA01-05R
D301	8-719-925-26	DIODE SLP-252B
IC101	8-759-935-58	IC TL4558PK
IC102	8-759-935-58	IC TL4558PK
IC105	8-759-800-28	IC LB1413
IC103	8-749-940-26	IC STK4026S
IC104	8-749-940-26	IC STK4026S
L101	1-420-872-00	COIL, AIR CORE
L151	1-420-872-00	COIL, AIR CORE
J1	1-507-804-00	JACK, LARGE TYPE
J101	1-507-807-00	JACK, PIN 2P
J201	1-507-807-00	JACK, PIN 2P

NOTE:

- Items with no part number and no description are not stocked because they are seldom required for routine service.
- Items marked "▲" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- Due to standardization, parts with part numbers (Δ-ΔΔΔ-ΔΔΔ-XX or Δ-ΔΔΔΔ-ΔΔΔ-X) may be different from those used in the set.

CAPACITORS:

- All capacitors are in μF. Common capacitors are omitted. Refer to the following lists for their part numbers.
- MF:μF, PF:μμF.

RESISTORS

- All resistors are in ohms. Common 1/4W, 1/8W and 1/16W carbon resistors are omitted. Refer to the following lists for their part numbers.

- F : nonflammable

COILS

- MMH : mH, UH : μH

The components identified by shading and mark ▲ are critical for safety. Replace only with part number specified.

SEMICONDUCTORS

In each case, U : μ, for example:
 UA....: μA...., UPA....: μPA...., UPC....: μPC,
 UPD....: μPD....

ELECTRICAL PARTS

<u>Ref.No.</u>	<u>Part No.</u>	<u>Description</u>
Q101	8-729-245-83	TRANSISTOR 2SC2458
Q102	8-729-245-83	TRANSISTOR 2SC2458
Q103	8-729-245-83	TRANSISTOR 2SC2458
Q104	8-729-245-83	TRANSISTOR 2SC2458
Q105	8-729-245-83	TRANSISTOR 2SC2458
Q106	8-729-245-83	TRANSISTOR 2SC2458
Q107	8-729-245-83	TRANSISTOR 2SC2458
Q108	8-729-245-83	TRANSISTOR 2SC2458
Q109	8-729-204-82	TRANSISTOR 2SA1048
Q110	8-729-245-83	TRANSISTOR 2SC2458
Q111	8-729-245-83	TRANSISTOR 2SC2458
Q112	8-729-413-10	TRANSISTOR 2SC1475
Q152	8-729-245-83	TRANSISTOR 2SC2458
Q153	8-729-245-83	TRANSISTOR 2SC2458
Q154	8-729-245-83	TRANSISTOR 2SC2458
Q155	8-729-245-83	TRANSISTOR 2SC2458
Q156	8-729-245-83	TRANSISTOR 2SC2458
Q201	8-729-334-58	TRANSISTOR 2SC1345
R132	△.1-212-873-00	FUSIBLE 47 5% 1/4W F
R211	△.1-247-192-00	CARBON 10 5% 1/2W F
R212	△.1-247-192-00	CARBON 10 5% 1/2W F
R261	△.1-247-192-00	CARBON 10 5% 1/2W F
R262	△.1-247-192-00	CARBON 10 5% 1/2W F
R316	△.1-212-849-00	FUSIBLE 4.7 5% 1/4W F
R319	△.1-247-209-00	CARBON 51 5% 1/2W F
RV1	1-228-777-00	RES, VAR, SLIDE 100K/100K
RV2	1-228-778-00	RES, VAR, SLIDE (BLOCK TYPE)
S1	1-554-268-00	SWITCH, PUSH (3 KEY)

NOTE:

- Items with no part number and no description are not stocked because they are seldom required for routine service.
- Items marked "△" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- Due to standardization, parts with part numbers (△-△△△-△△△-XX or △-△△△△-△△△-X) may be different from those used in the set.

CAPACITORS:

- All capacitors are in μF . Common capacitors are omitted. Refer to the following lists for their part numbers.
MF: μF , PF: μF .

RESISTORS

- All resistors are in ohms. Common 1/4W, 1/8W and 1/16W carbon resistors are omitted. Refer to the following lists for their part numbers.

- F : nonflammable

COILS

- MMH : mH, UH : μH

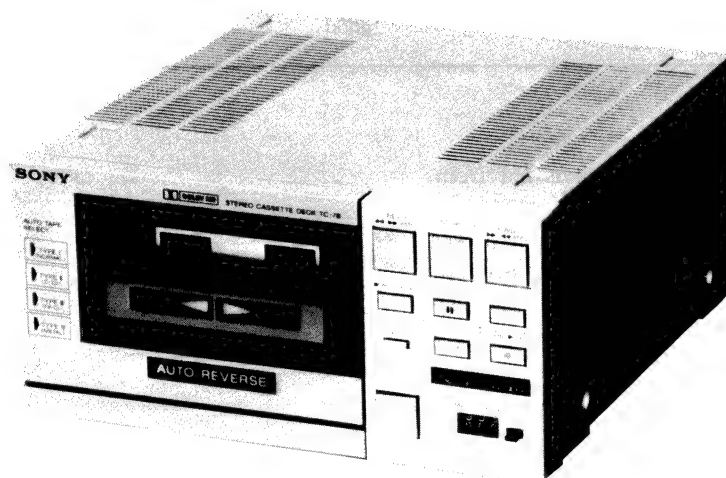
The components identified by shading and mark △ are critical for safety. Replace only with part number specified.

SEMICONDUCTORS

In each case, U : μ , for example:
UA...: μA ..., UPA...: μPA ..., UPC...: μPC ,
UPD...: μPD ...

CASSETTE DECK

[TC-78]



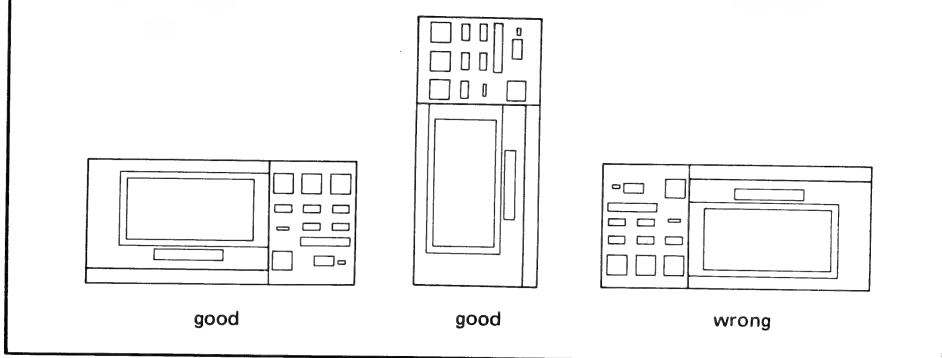
Note: TC-78 is a stereo cassette deck unit in FH-7.

Tape Transport Mechanism Type	TCM-130R2
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SERVICING NOTE

NOTES ON REPAIR

When the mech deck is operated with the set in an upside-down position, misoperation may result. For repair while operating the mech deck, perform with the set in its normal position or standing on its side.

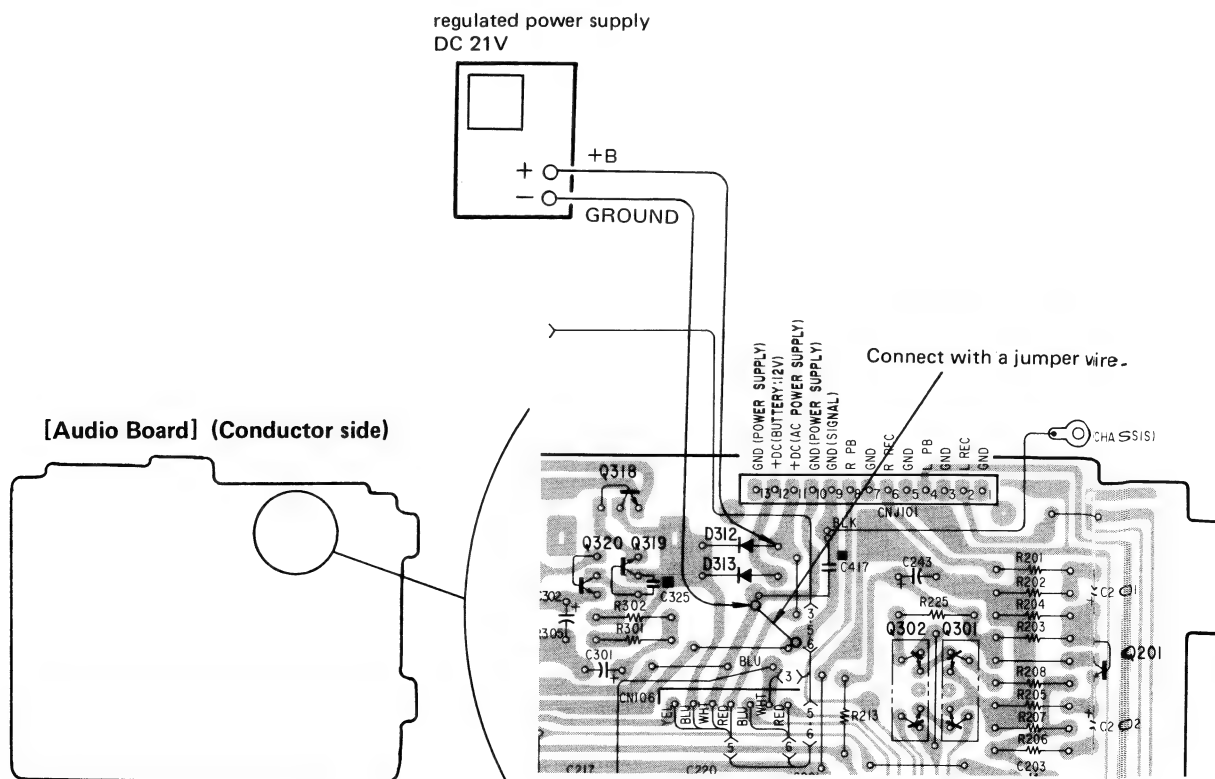


[To apply B+ voltage in repair]

The power supply voltage of this unit is fed from AC-78 via TA-78.

There are two ground lines for signal and power supply circuits, which are not connected in this unit. When this unit alone operates, connect the two ground lines with a jumper wire and a regulated power supply as illustrated.

After repairing, remove the jumper wire connected.



SECTION 1
CIRCUIT DESCRIPTION1-1. C-MOS MECHANISM CONTROLLER
TC9310N-001 (IC401)

* See page 3, 4 for MOS IC

(1) OUTLINE

This IC electrically controls the mechanism of this set. This IC puts out the required output signals in accordance with the switched-in commanding input signals with predetermined processing timings. This IC consists mainly of the following six blocks.

1. Input Circuits:

The input circuits eliminate chattering of the input signals, determine the priority of input switches and then latch the operational or desired mode.

2. Control Circuits:

The control circuits generate signals to control the timer operation, automatic music-selection (AMS) operation, automatic operation, reset operation, etc.

3. LED-Drive Circuits:

This circuits put out the drive signals to LED indicate the mode specified by items 1, 2.

4. Timing Circuits:

This circuit makes the switching periods of the output signals in good timings everytime a mode is changed to another one specified by items 1, 2.

5. Solenoid and Motor-Drive Output Circuits:

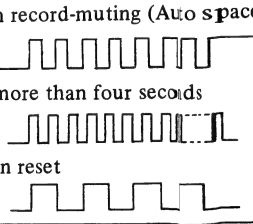
These circuits put out signals to operate the mechanism of the deck. The circuits connect to the solenoid-and motor-drive circuits.

6. Muting Signal Output Circuits:

These circuits connect to the amplifier circuits for the elimination of noise and selection of audio-signal system.

(2) FUNCTION OF EACH TERMINAL

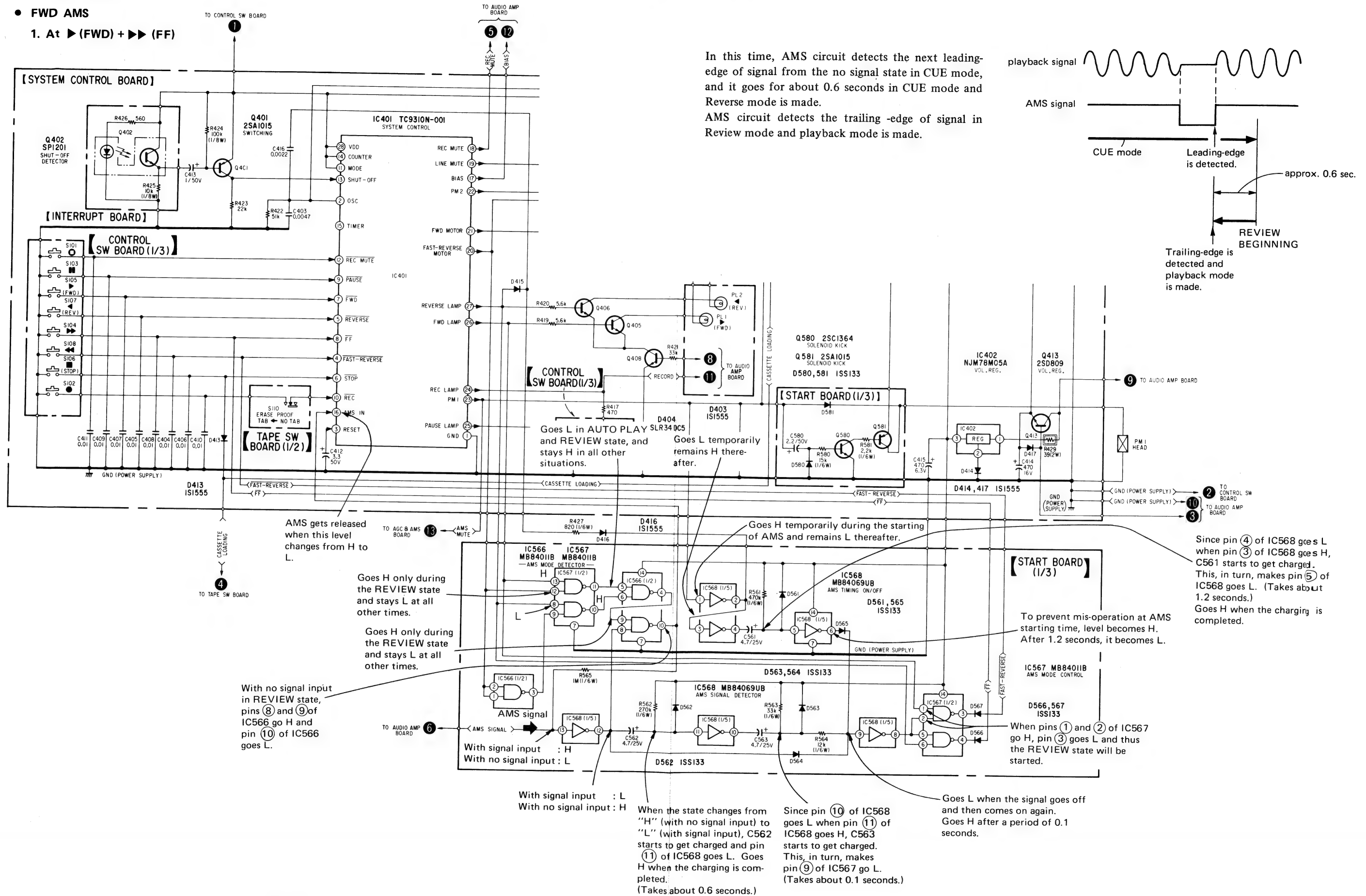
Terminal No.	Name	Function	Terminal No.	Name	Function
1.	GND	Grounding terminal of power supply.			
2.	OSC	Clock OSC terminal. (approx. 9kHz in this set.)			
3.	RESET (INPUT)	Signal input to put all of the operation of the set into the initial state.			This terminal becomes in AMS operation when this terminal is put into "L" together with FF or FAST-REVERSE input simultaneously.
4.	FAST REVERSE (INPUT)	Signal input to command the mechanism to Fast-Forward mode of REVERSE direction.			This terminal becomes in the commanding signal to put the set in auto play when this terminal becomes in "L" together with FAST-REVERSE input simultaneously.
5.	REV (INPUT)	Signal input to command the mechanism to playback the tape of REVERSE direction. This terminal becomes in AMS operation when this terminal is put into "L" together with FF or FAST-REVERSE input simultaneously.	8.	FF (INPUT)	Signal input to command the mechanism to set in fast-forward mode.
6.	STOP (INPUT)	Signal input to release a mode designated by other input switches.	9.	PAUSE (INPUT)	Command-signal input to make the set in stop operation temporarily, i.e., pause, or restart operation during playback and record mode. This is of a self-set and self-reset type. This terminal is reset when the mode is in fast-forward or fast-reverse and STOP and REC MUTE signals are in "L". In other conditions, this terminal can be reset or set. In auto-space operation, this terminal is command-signal input to release record-muting mode in case REC MUTE is in "H".
7.	FWD (INPUT)	Signal input to command the mechanism to playback the tape. This terminal becomes in record-mode command signal when this terminal is put into "L" together with REC-signal input at the same time.			

Terminal No.	Name	Function	Terminal No.	Name	Function
10.	REC (INPUT)	Signal input to command the set to become in record-monitor mode. This input is disabled when the set is in fast-forward or fast-reverse and STOP input is in "L".	18.	REC MUTE (OUTPUT)	Record mode: L Otherwise: H
11.	REC MUTE (INPUT)	Command-signal input to mute record signal and effective only in record and record pause modes. When this signal is in "L", pause operation is reset. Muting operation is maintained for four seconds after disappearance of this signal (auto-space operation). Auto-space operation is released on receipt of PAUSE input in "L" when this input is in "H".	19.	LINE MUTE (OUTPUT)	Puts out "H" signal in playback (▶, ◀ direction), record, record-monitor, record-pause and record-muting modes. Line muting is off with this signal in "H", Otherwise; L.
12.	MODE (INPUT)	MODE select input Open: Relay style FWD direction L: Slide switch style FWD direction H: FWD/REV directions	20.	FAST-REVERSE MOTOR (OUTPUT)	Puts out "H" signal in fast-reverse (◀◀), auto-play AMS (▶+◀◀, ◀+◀◀) and rewind mode in AMS (▶+▶▶). Otherwise; L
13.	SHUT OFF (INPUT)	Input of tape-travel detection. Pulse signal is put into this terminal during forward, fast forward, rewind and record modes. In forward and record modes, the mechanism shuts off and becomes in stop mode in two seconds after the stoppage of tape travel, i.e., stop of pulse. In fast-forward and fast-reverse modes, the mechanism shuts off and becomes in stop mode one second after the stoppage of tape travel likewise.	21.	FWD MOTOR (OUTPUT)	Puts out "H" signal in playback (▶, ◀ direction), record, record-muting, FF, AMS (▶+▶▶, ◀+◀◀) modes and rewind mode in AMS (◀+◀◀). Otherwise; L
14.	COUNTER (INPUT)	Commanding-signal input to stop the mechanism or to put the set into forward mode during rewind mode. Forward mode is made when FAST-REVERSE and FORWARD switches are pressed at the same time. In other modes than rewind, this signal is not accepted. Also this signal is not accepted even in rewind mode when FAST-REVERSE switch is kept pressed. This terminal is not used on TC-78.	22.	PM2 (OUTPUT)	Puts out "H" signal in pause at FF (▶▶) and AMS modes. Momentarily puts out "H" signal in REV (◀) mode. Otherwise; L.
15.	TIMER (OUTPUT)	Puts out "L" signal for only 0.5 second after four-second resetting.	23.	PM1 (OUTPUT)	Puts out "H" signal in playback (▶, ◀ direction), record, record-muting modes. Momentarily puts out "H" signal in AMS mode. Otherwise; L.
16.	AMS (INPUT)	Signal input to put the set into AMS operation. AMS mode is made when this signal is in "L".	24.	REC LAMP (OUTPUT)	Puts out "H" signal in record, record-monitor, record-pause and record-muting modes. Otherwise; L.
17.	BIAS (OUTPUT)	Puts out "H" signal in record and record-muting modes. Otherwise; L	25.	PAUSE LAMP (OUTPUT)	Puts out "H" signal in pause mode. Puts out "H" and "L" signals alternately during record muting and during reset mode 
			26.	FWD LAMP (OUTPUT)	Puts out "H" signal in FWD (▶ direction), forward pause, record, record-pause, auto play and AMS (▶+▶▶, ▶+◀◀ direction) modes. Otherwise; L
			27.	REVERSE LAMP (OUTPUT)	Puts out "H" signal in reverse playback (◀ direction), playback-pause and reverse AMS (◀+▶▶, ◀+◀◀ direction) modes. Otherwise; L
			28.	VDD	5V power source terminal

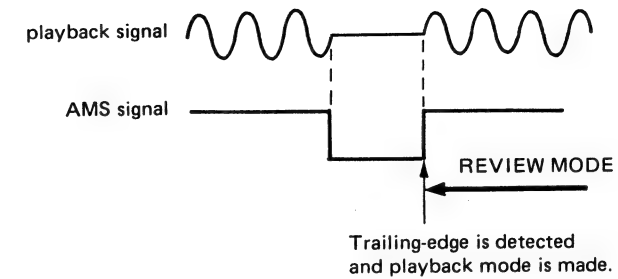
1-2. AMS CIRCUIT

• FWD AMS

1. At ► (FWD) + ►► (FF)



In this time, AMS circuit detects the trailing-edge of signal in Review mode and playback mode is made.

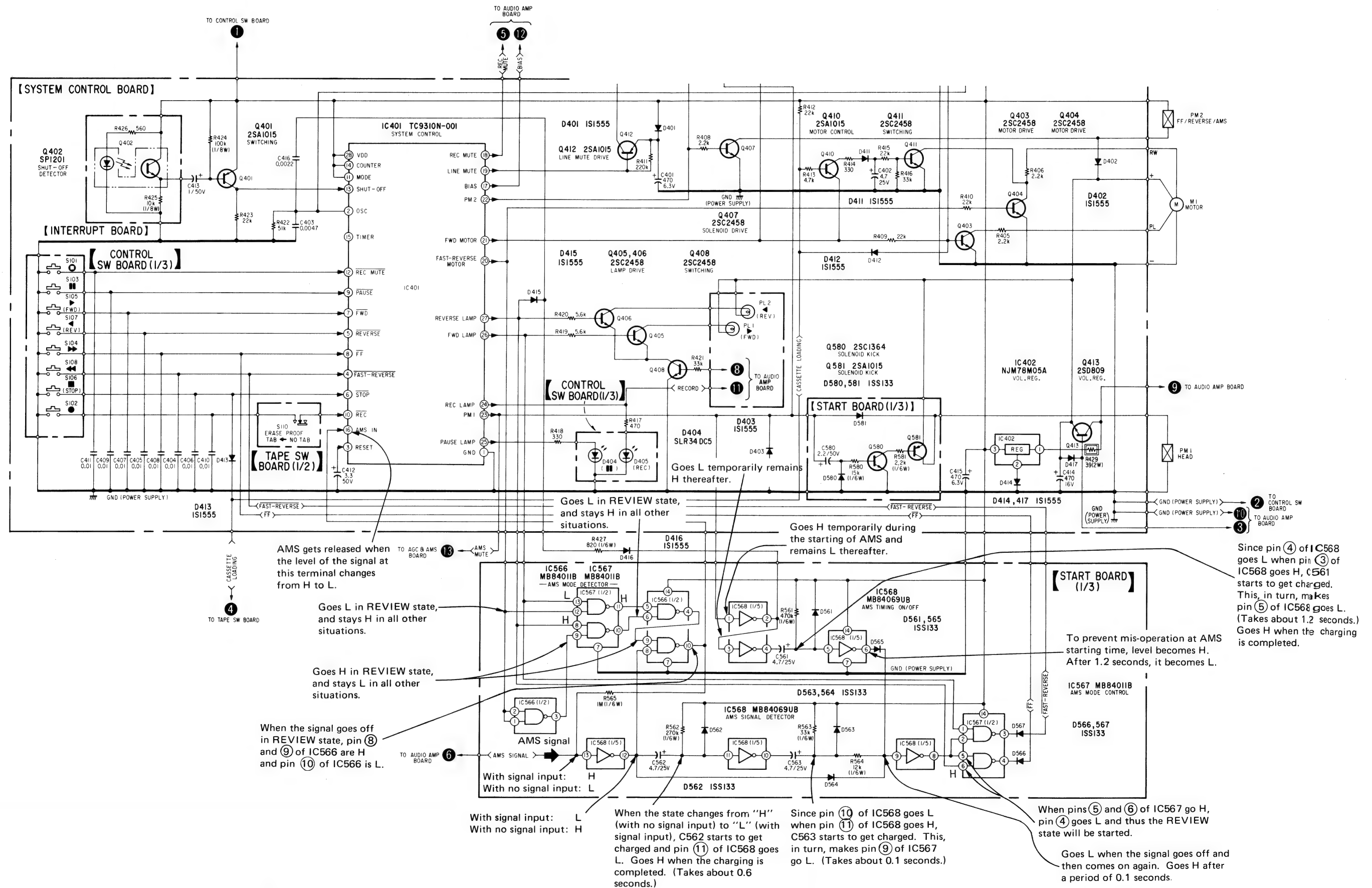


► (FWD) + ◄◄ (FAST-REVERSE) of FWD AMS mode.



2. At ◀ (REVERSE) + ◀◀ (FAST-REVERSE)

AMS signal detection is the same as detection at
▶ (FWD) + ▶▶ (FF) of FWD AMS mode.



1-3. IC585 and Q585

• Purpose

This circuitry is provided to stop the motor momentarily when the REVERSE (◀) button is depressed with the deck in the FF (▶▶) mode, and at the same time, also extend the cycle of the clock signal while the motor is stationary, in order to provide the correct timing for IC401.

• Function

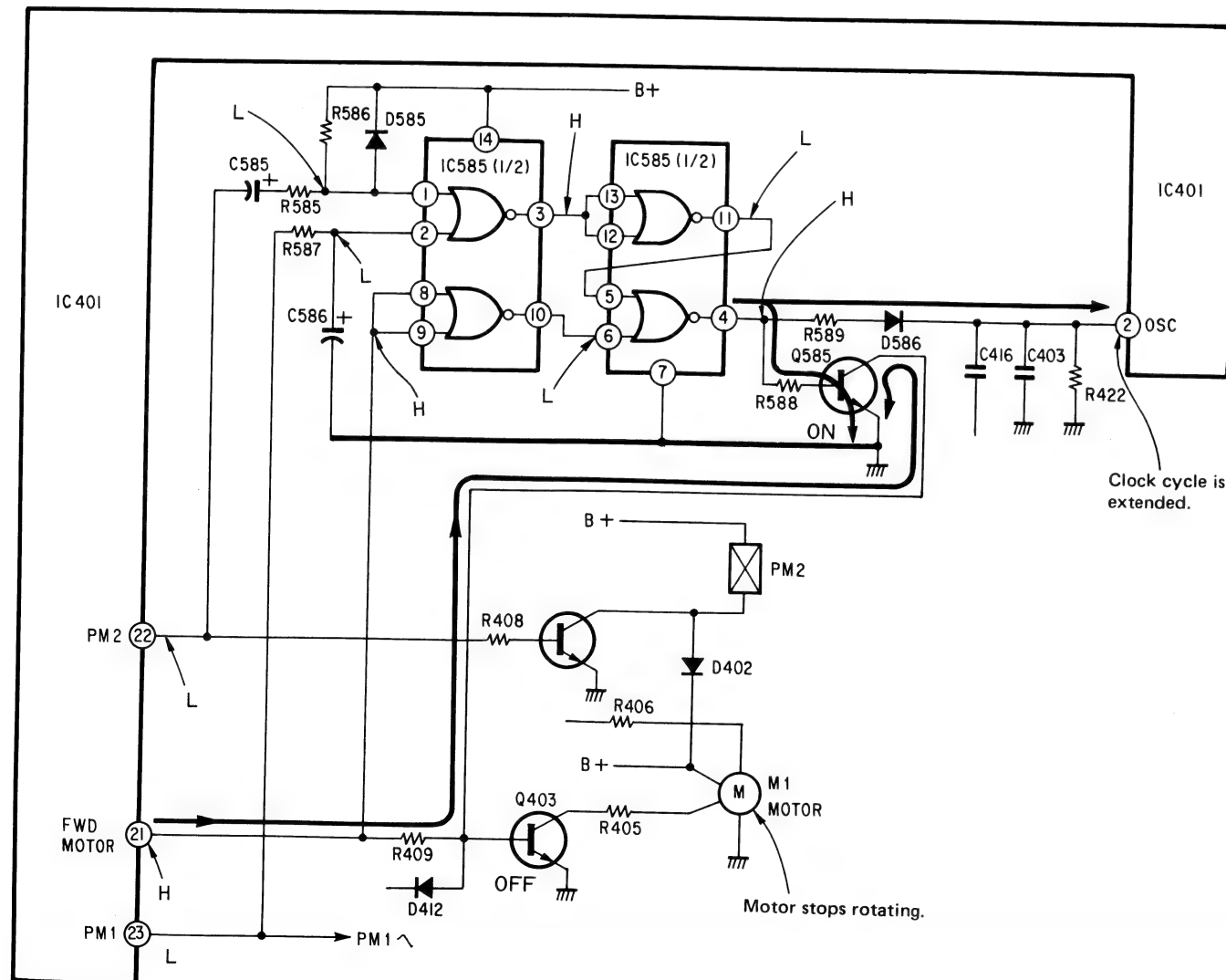
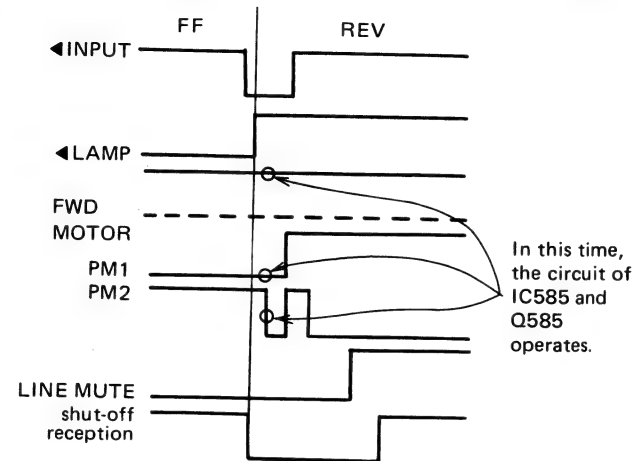
When the REVERSE (◀) button is depressed with the deck in the FF (▶▶) mode and the deck goes into the REV mode, terminal (21) of IC401 stays at 'H' and so the motor continues to turn.

When in the FF (▶▶) mode, there is a period of approximately two seconds from the time that the deck reaches the end of the tape to the time that it shuts off.

If the REVERSE (◀) button is depressed during this shutting off period, PM2 momentarily goes to 'L', however, the motor continues to turn and so the FR gear and the reel gear (take-up side)

stay engaged. In order to prevent this, Q585 goes ON when the REVERSE (◀) button is depressed to forcibly stop the motor and disengage the gears. In order to provide the proper timing for IC401, the clock cycle is extended by the time that the motor is stationary.

• IC401 timing when going from FF to REVERSE



1-4. Q410 and Q411

• Purpose

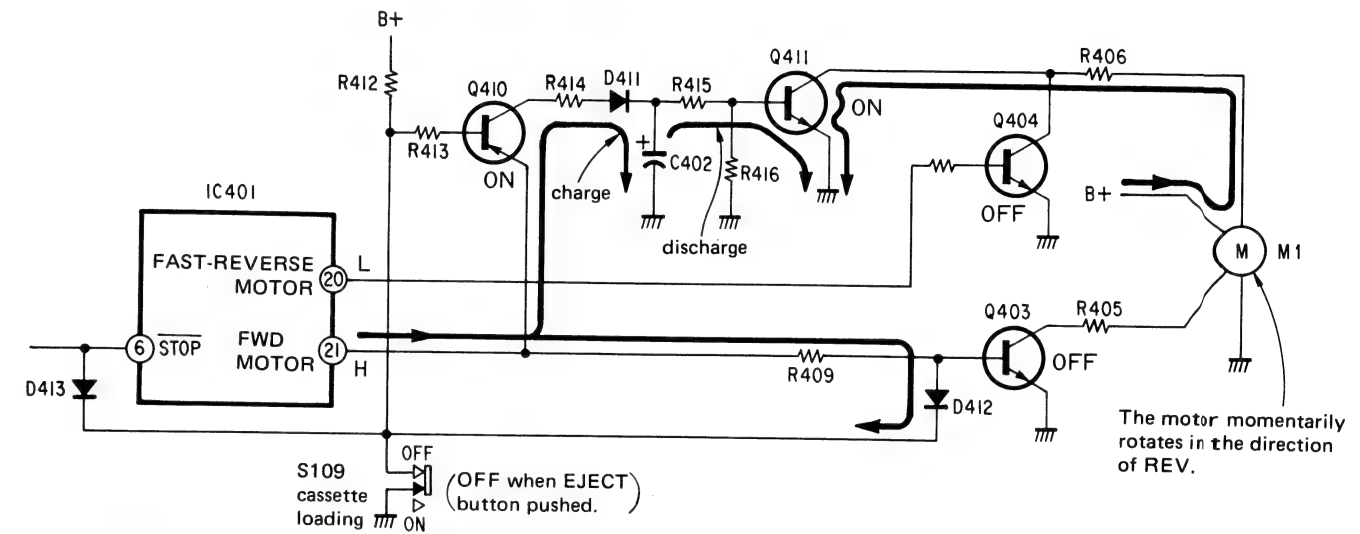
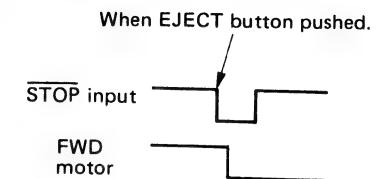
Q410 and Q411 are used to prevent the head from striking the cassette half when it opens and sustaining damage.

• Function

It requires approximately 0.8 seconds for the FWD cam gear to make one revolution when the FWD or REV buttons are depressed. If during this time the EJECT button is depressed, the head will rise up into the cassette housing cover as it opens and could sustain damage by striking the edge of the cassette half. Therefore, in order to prevent this, the moment that the EJECT button is depressed, the cathode of D412 is grounded to prevent the motor from turning

in the FWD direction; Q410 and Q411 go ON, to turn the motor in the REVERSE direction and turn the FWD cam gear in the reverse direction, and lower the head mounting base (R).

- Timing of IC401 when eject button is depressed
- When EJECT button is depressed



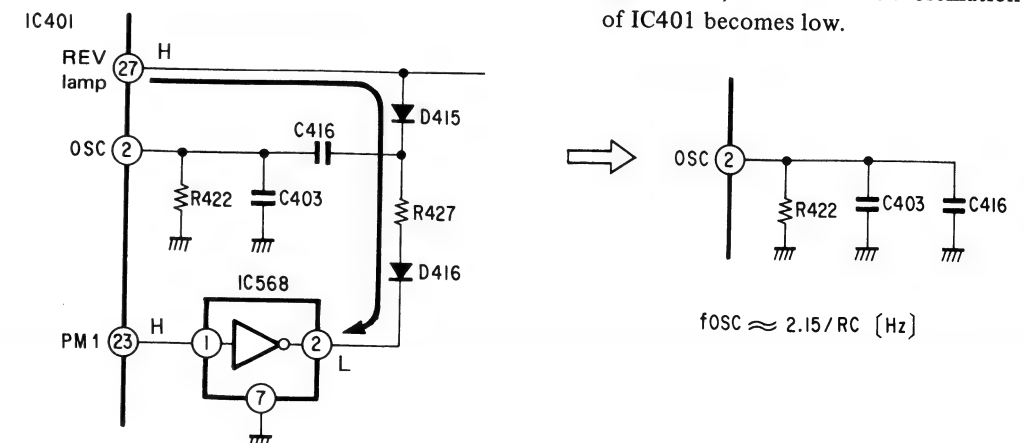
1-5. C416

• Purpose

C416 is provided in order to lower the clock oscillation frequency of IC401 when the deck is in the REVERSE (◀) mode, to make the ON time of PM2 0.8 seconds (time required for the FF cam gear to turn one revolution).

• Function

When in the REVERSE (◀) mode, terminals (27) and (23) of IC401 go 'H' and current flows as shown in the illustration below; and this causes the resistance of D415 and D416 to come down. This then causes C416 to be connected in parallel with C403, and the clock oscillation frequency of IC401 becomes low.



SECTION 2

OPERATION DESCRIPTION

The mechanism of this deck provides selection of different modes by kicking the FWD cam gear and FF cam gear by the solenoid coils (PM1, PM2) to engage them with the drive gear (T) and turn.

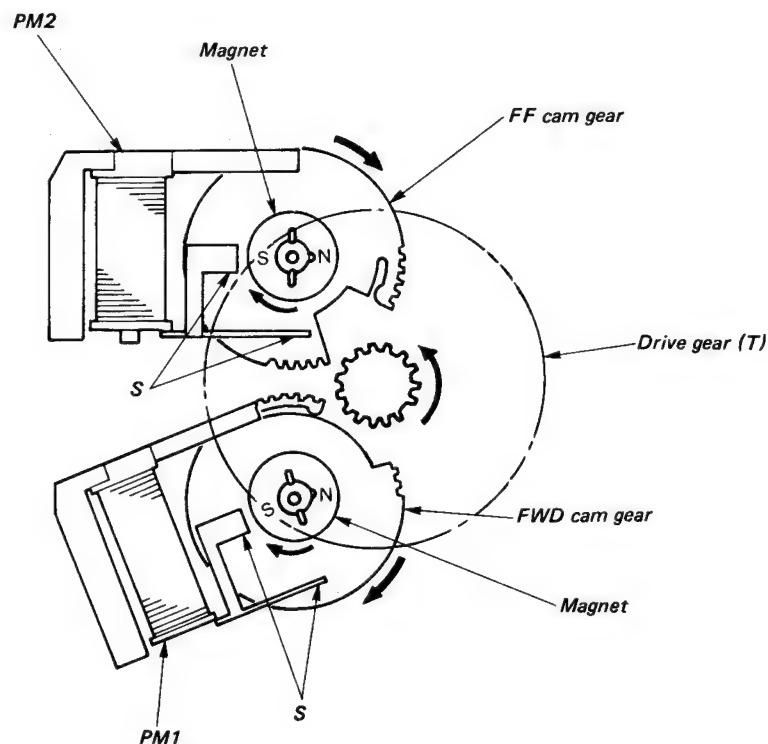
The drive gear (T) is driven by the flywheel that is engaged with the pinion secured to the flywheel. The various different modes are described below.

2-1. Kicking function for FWD cam gear, FF cam gear when current is flowing through solenoid

The magnet is turned in a clockwise direction by the magnetic force generated by the solenoid coil. Since the magnet turns, the FWD cam gear and FF cam gear that are integrated with the magnet are kicked in the direction indicated by the arrow, to engage the drive gear (T).

When the drive gear (T) turns, the FWD cam gear and the FF cam gear turn one time, and the cutaway sections of these gear cause them to disengage from the drive gear (T).

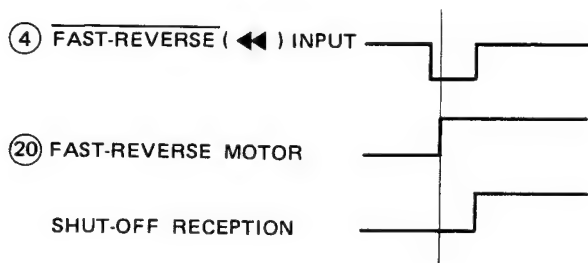
KICK OPERATION OF CAM GEAR



2-2. FAST-REVERSE MODE

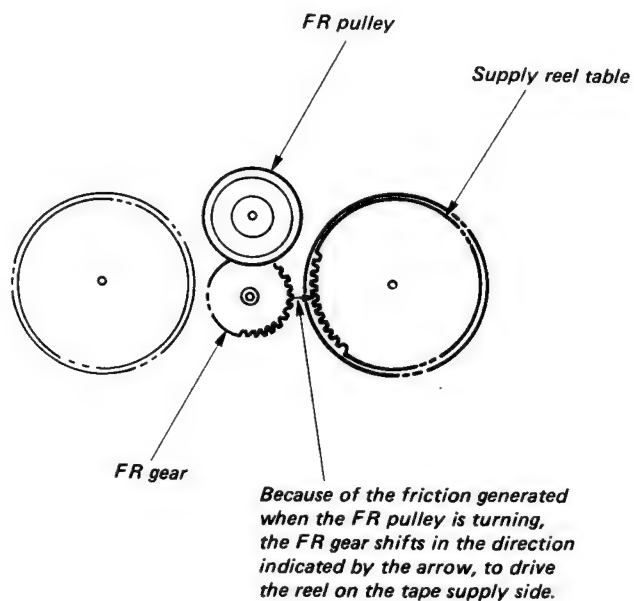
• TIMING OF IC401

STOP → FAST-REVERSE



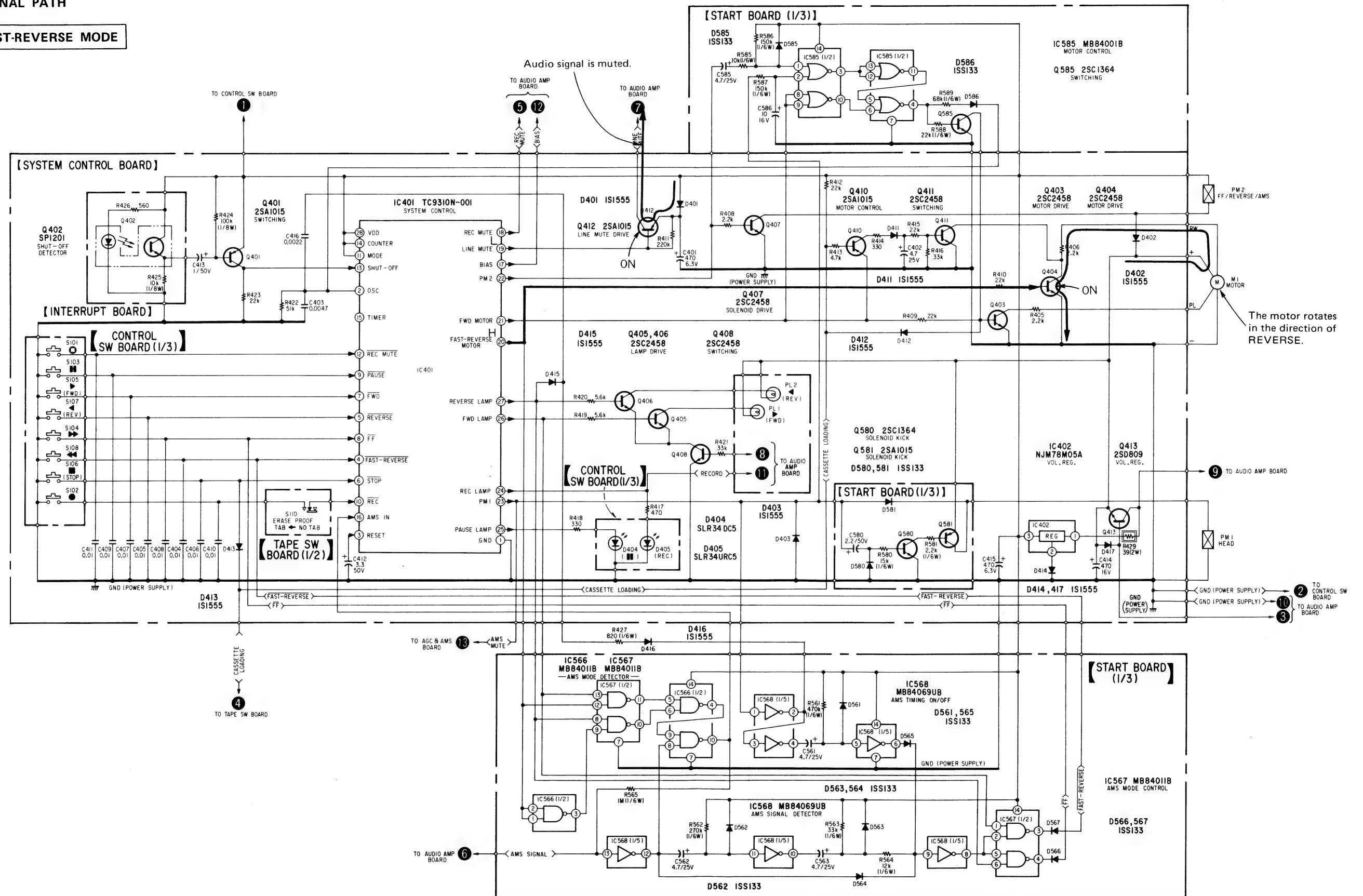
• MECHANISM OPERATION

FAST-REVERSE OPERATION



• SIGNAL PATH

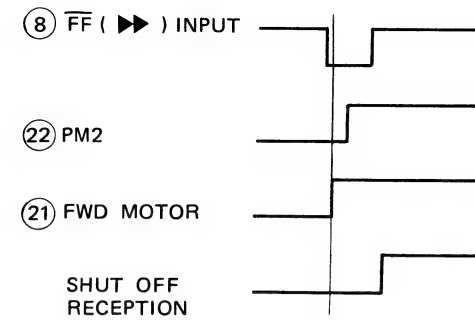
FAST-REVERSE MODE



2-3. FF MODE

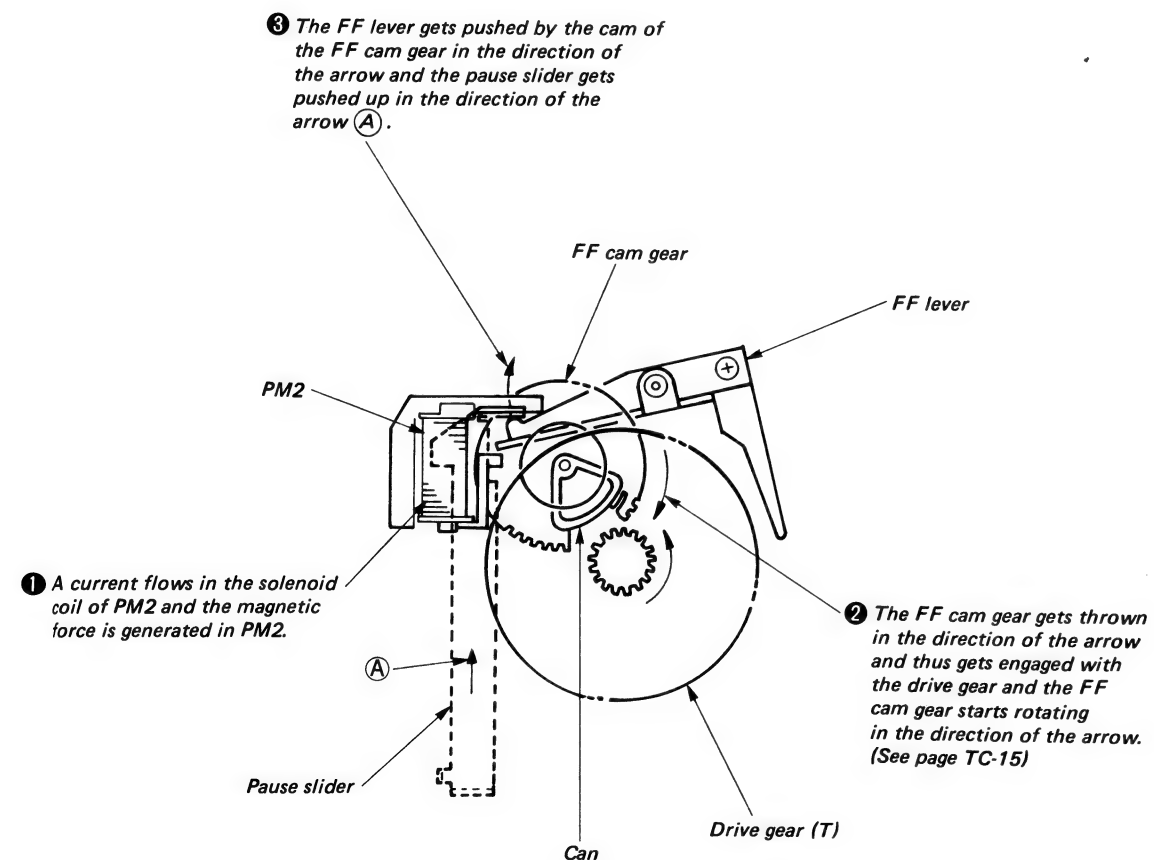
• TIMING OF IC401

STOP → FF

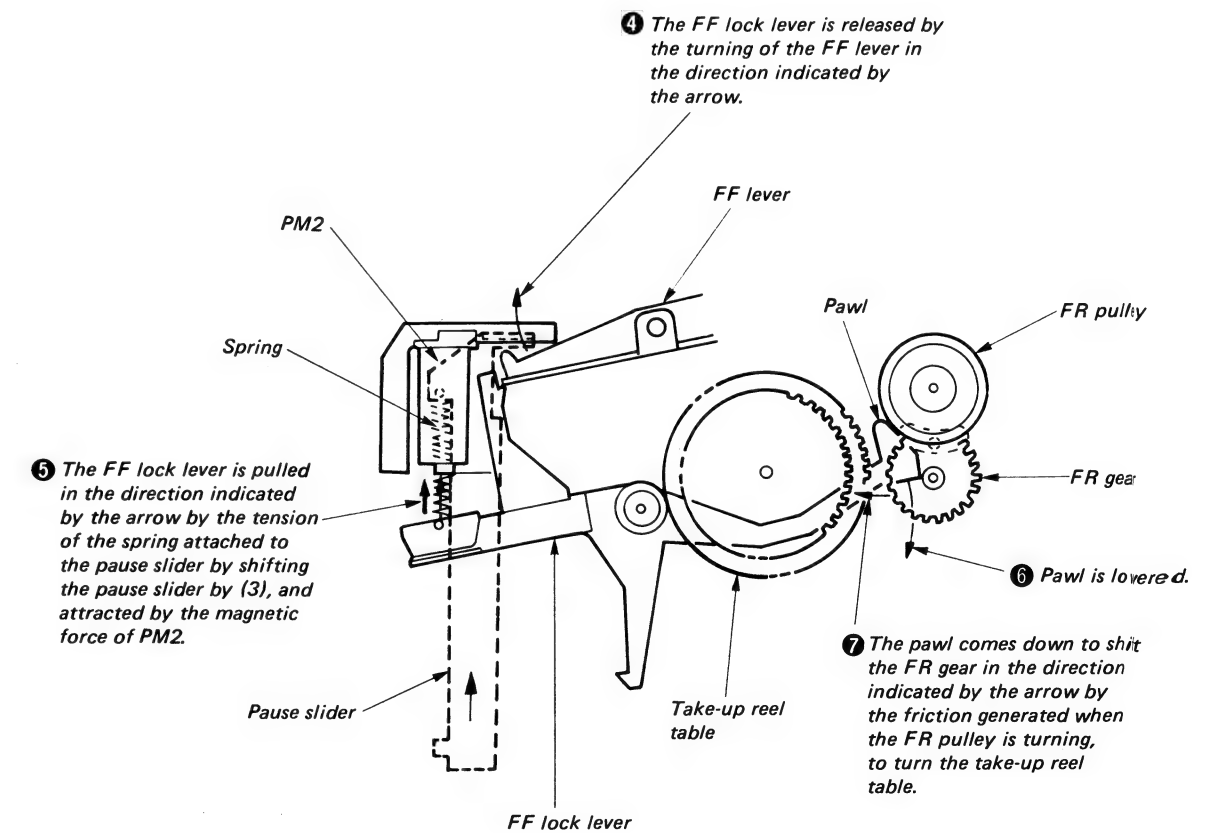


• MECHANISM OPERATION

FF OPERATION (1)

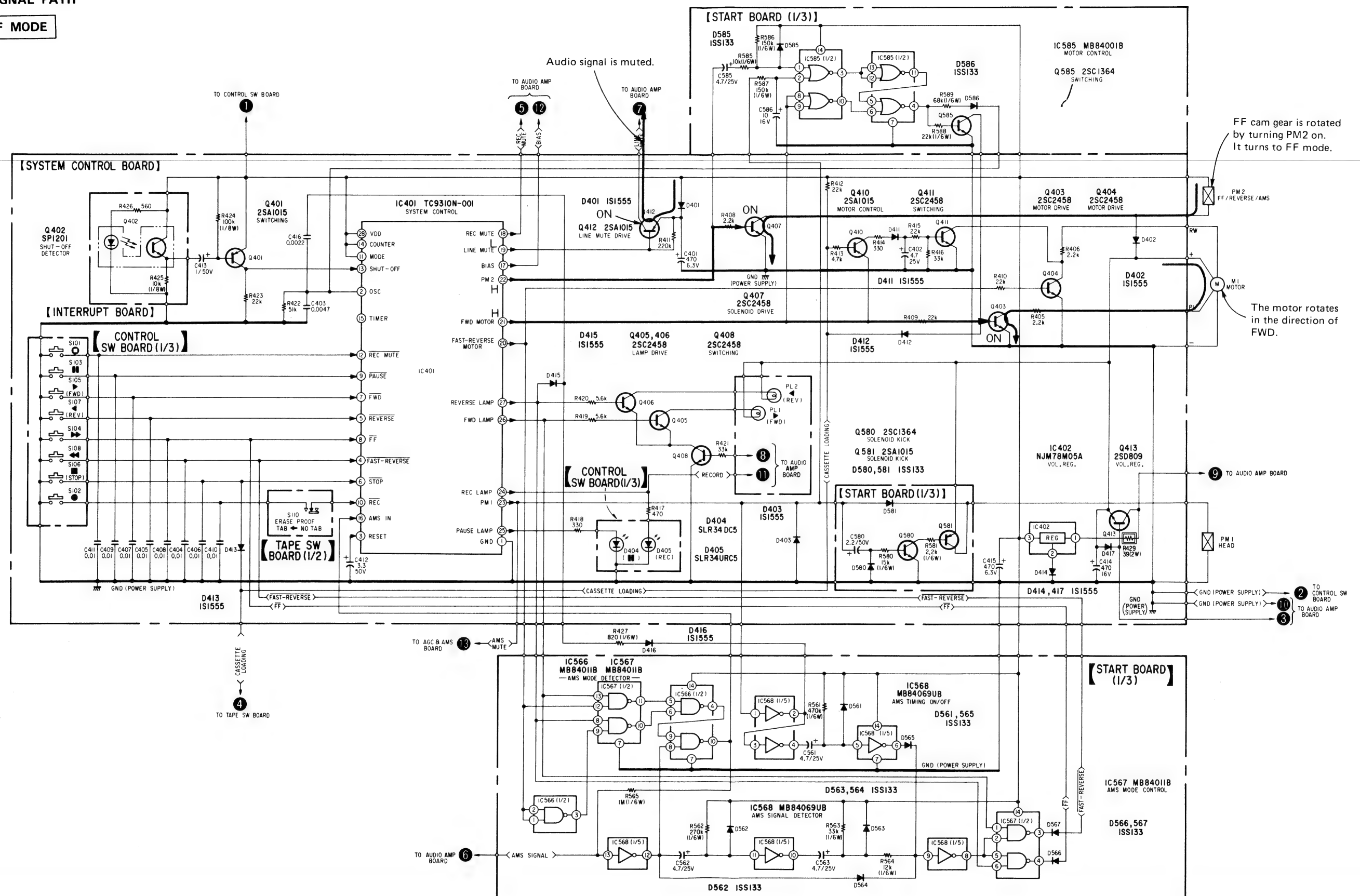


FF OPERATION (2)



● SIGNAL PATH

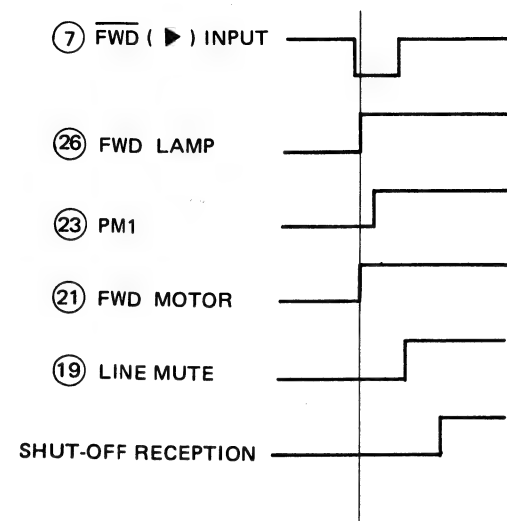
FF MODE



24. FWD MODE

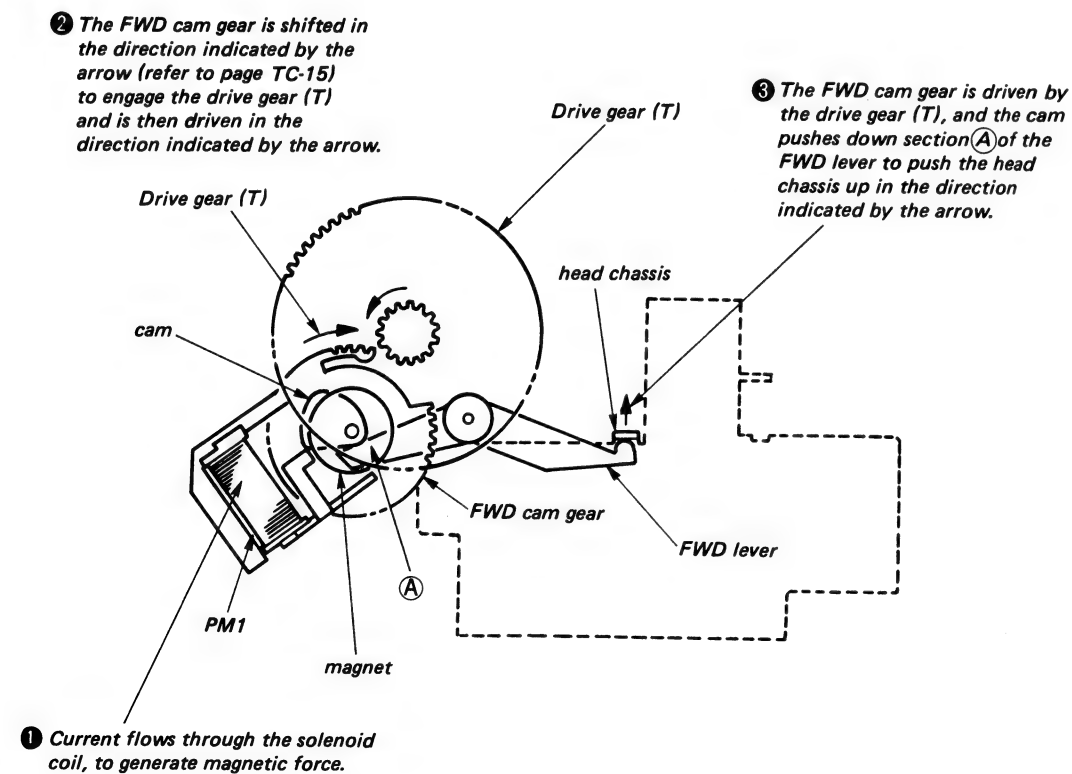
• TIMING OF IC401

STOP → FWD

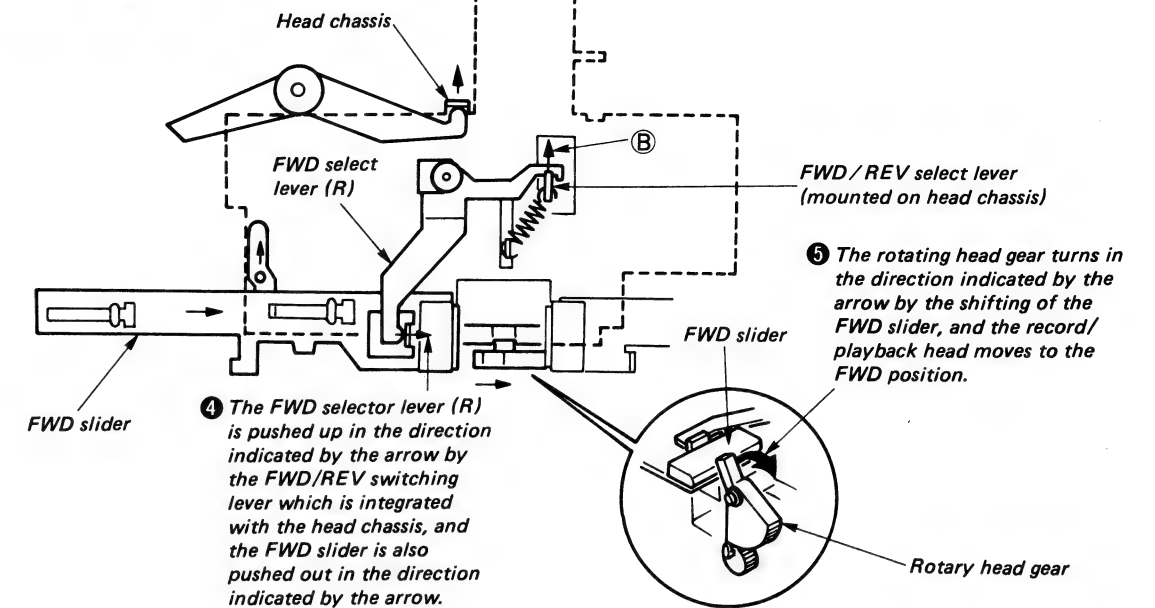


• MECHANISM OPERATION

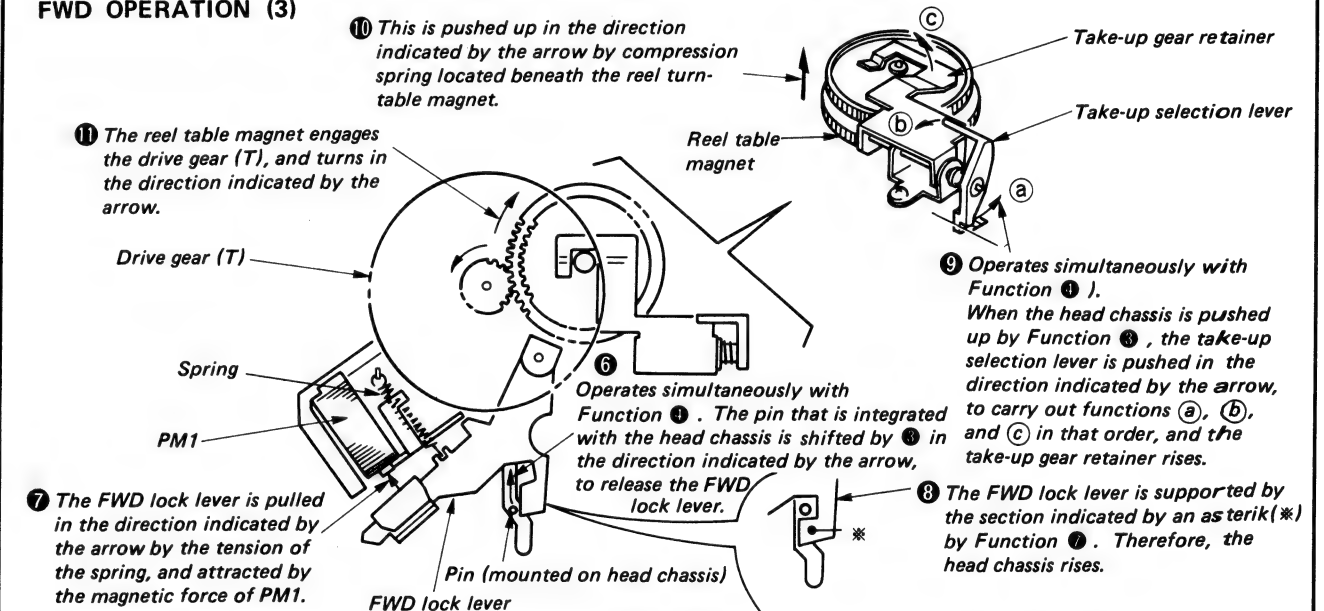
FWD OPERATION (1)



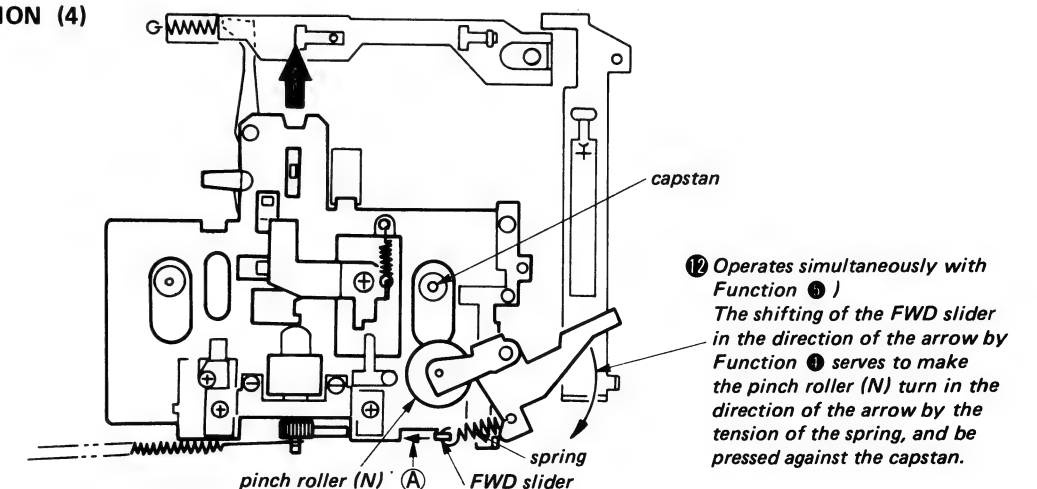
FWD OPERATION (2)



FWD OPERATION (3)

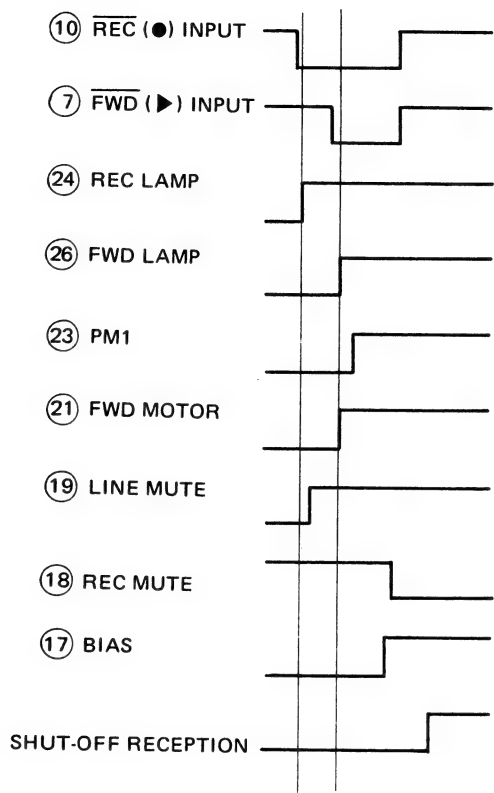


FWD OPERATION (4)



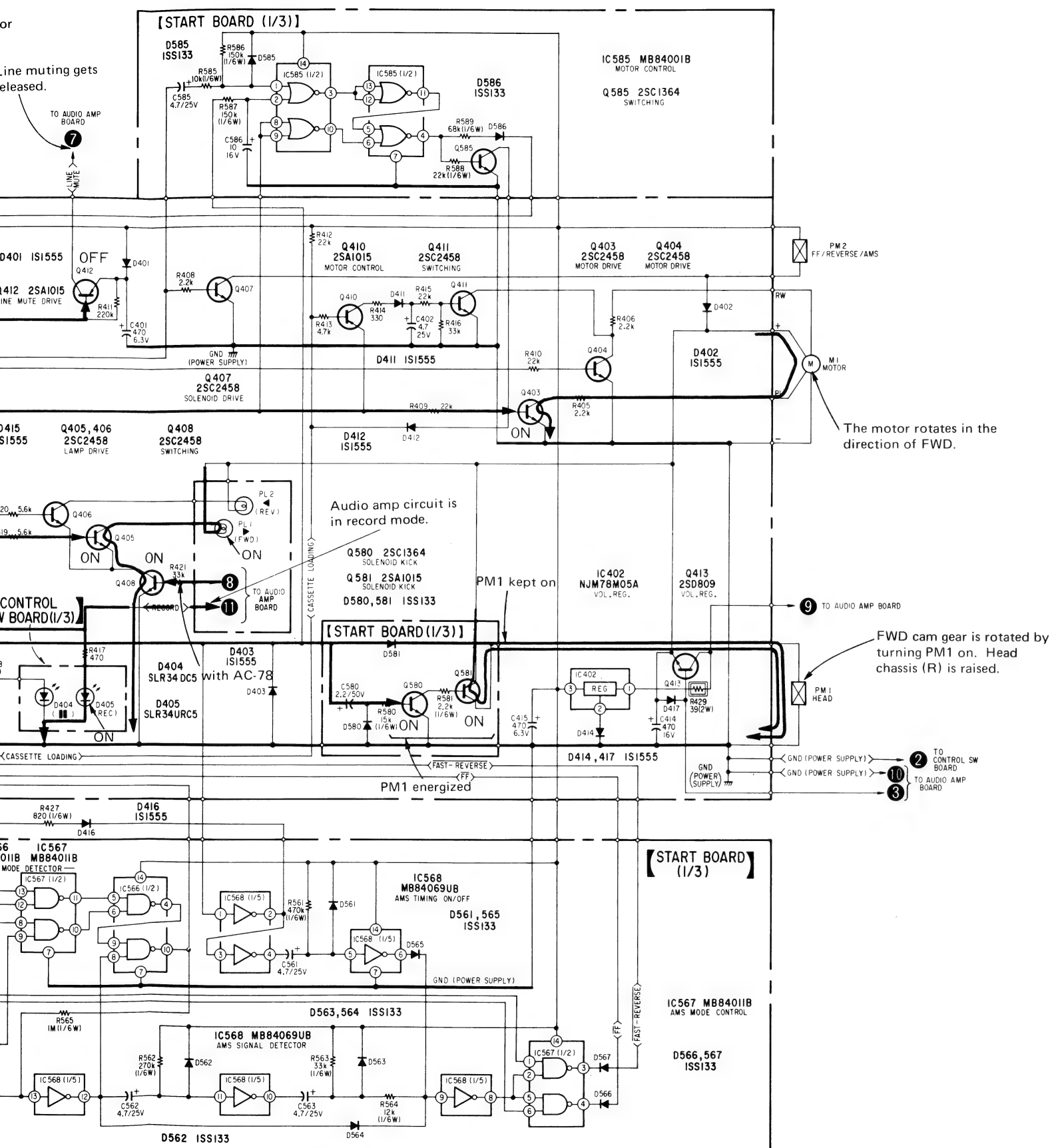
2-5. REC/FWD MODE

- TIMING OF IC401
- STOP → REC FWD



- MECHANISM OPERATION

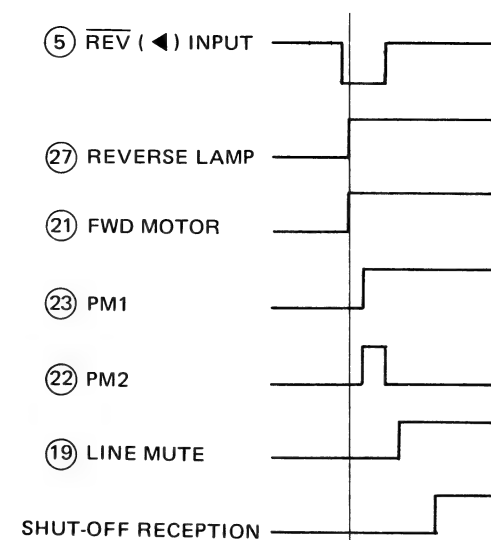
The mechanism operation at this mode is the same as that at FWD mode.



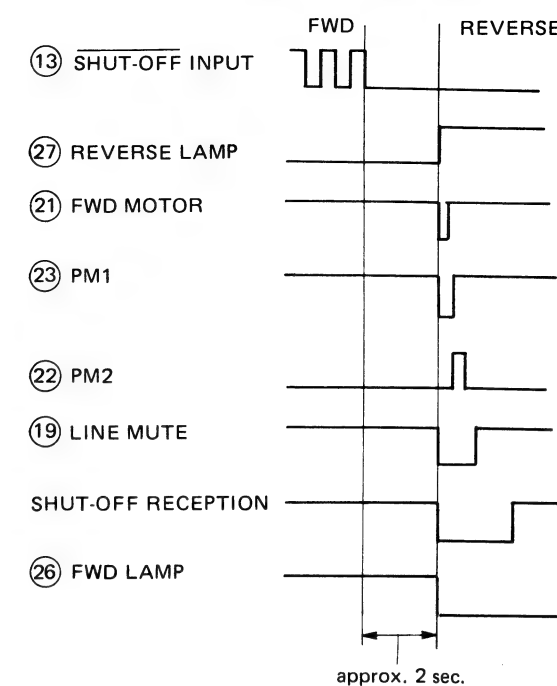
2-6. REV MODE

- **TIMING OF IC401**

STOP \rightarrow REVERSE

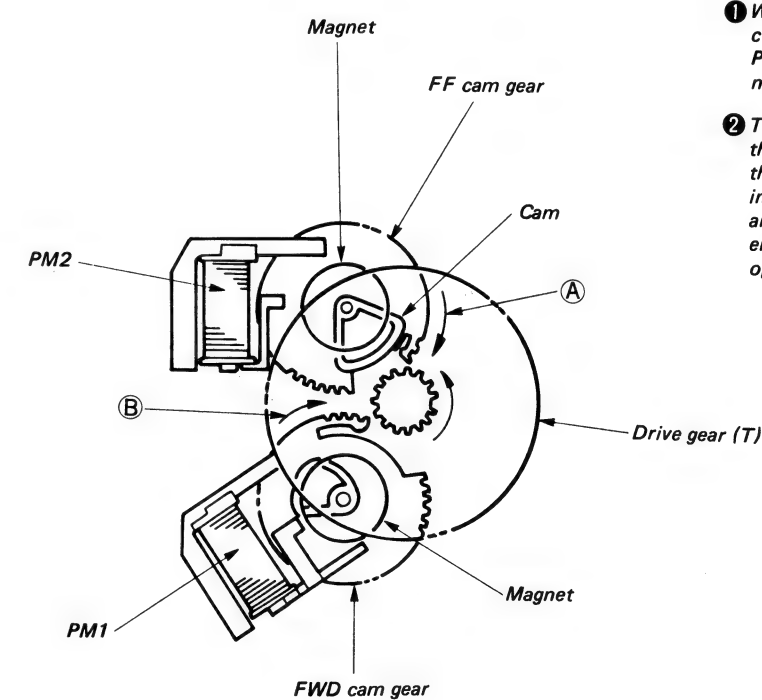


SHUT-OFF
FWD → REVERSE



- **MECHANISM OPERATION**

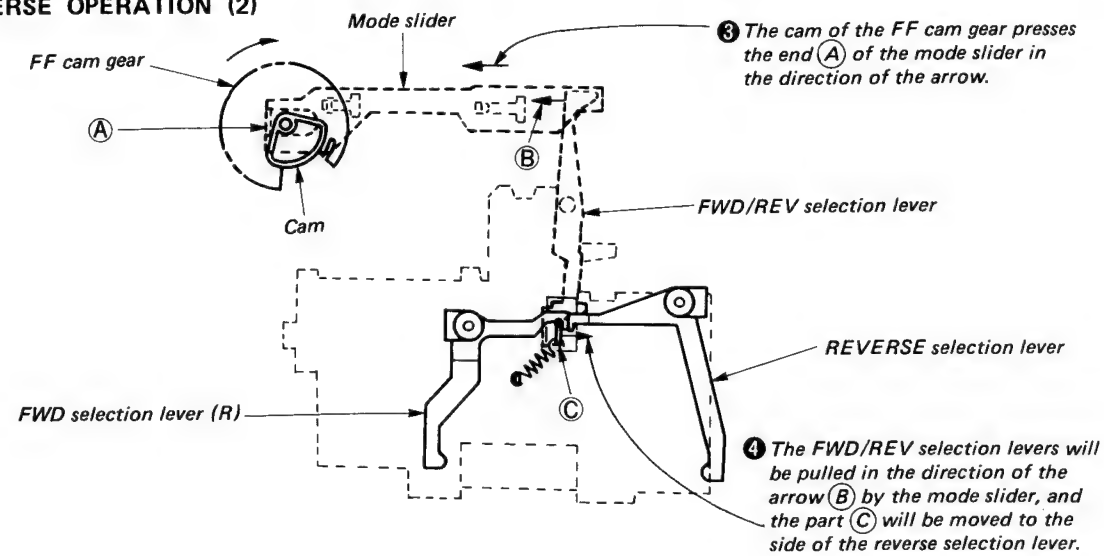
REVERSE OPERATION (1)



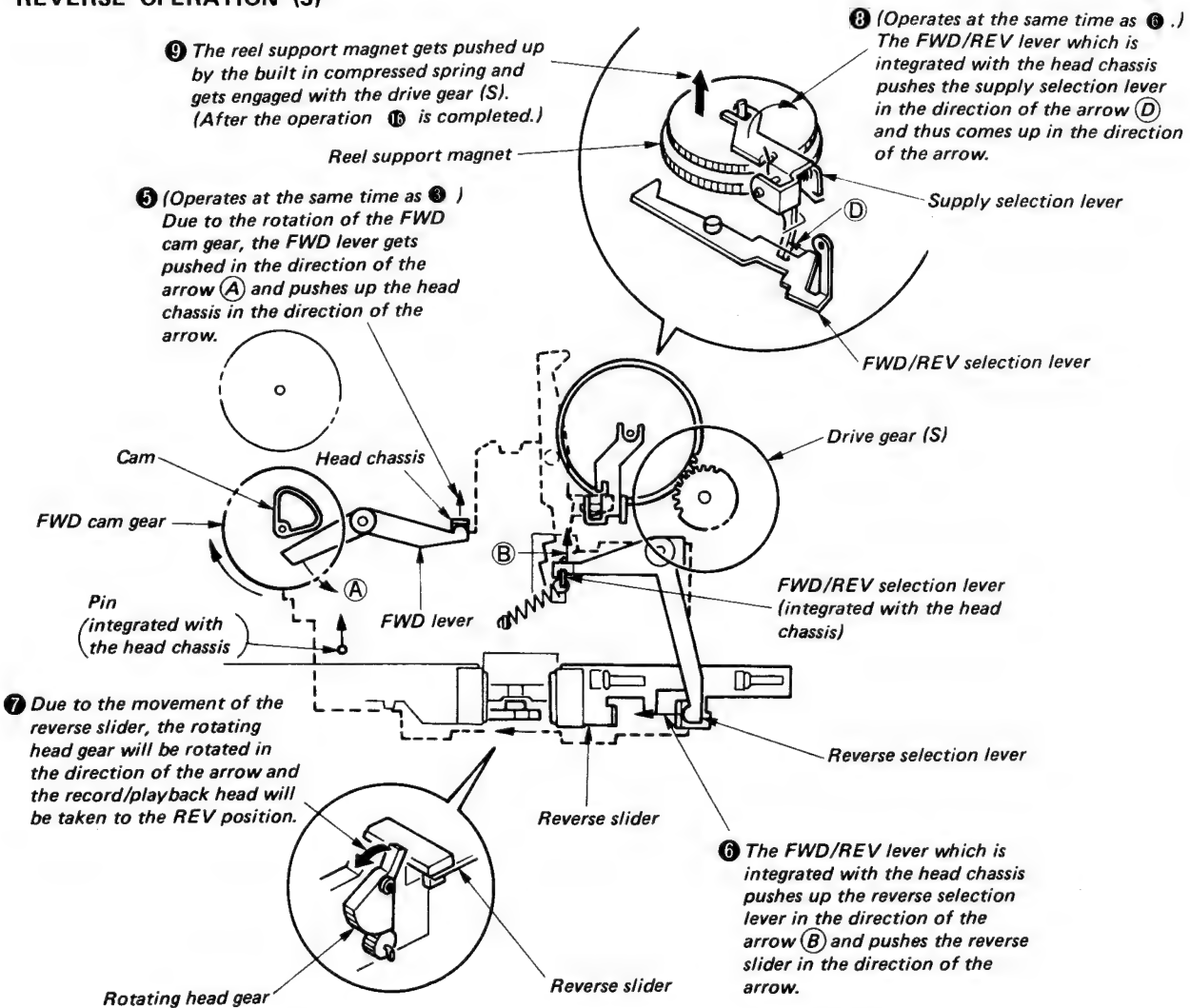
1 When the REV button is pressed, current flows in the coils PM1 and PM2 thus generating the respective magnetic fields.

② The FF cam gear will be thrown in the direction of the arrow (A) and the FWD cam gear will be thrown in the direction of the arrow (B), and hence the drive gear will be engaged for the corresponding operation.

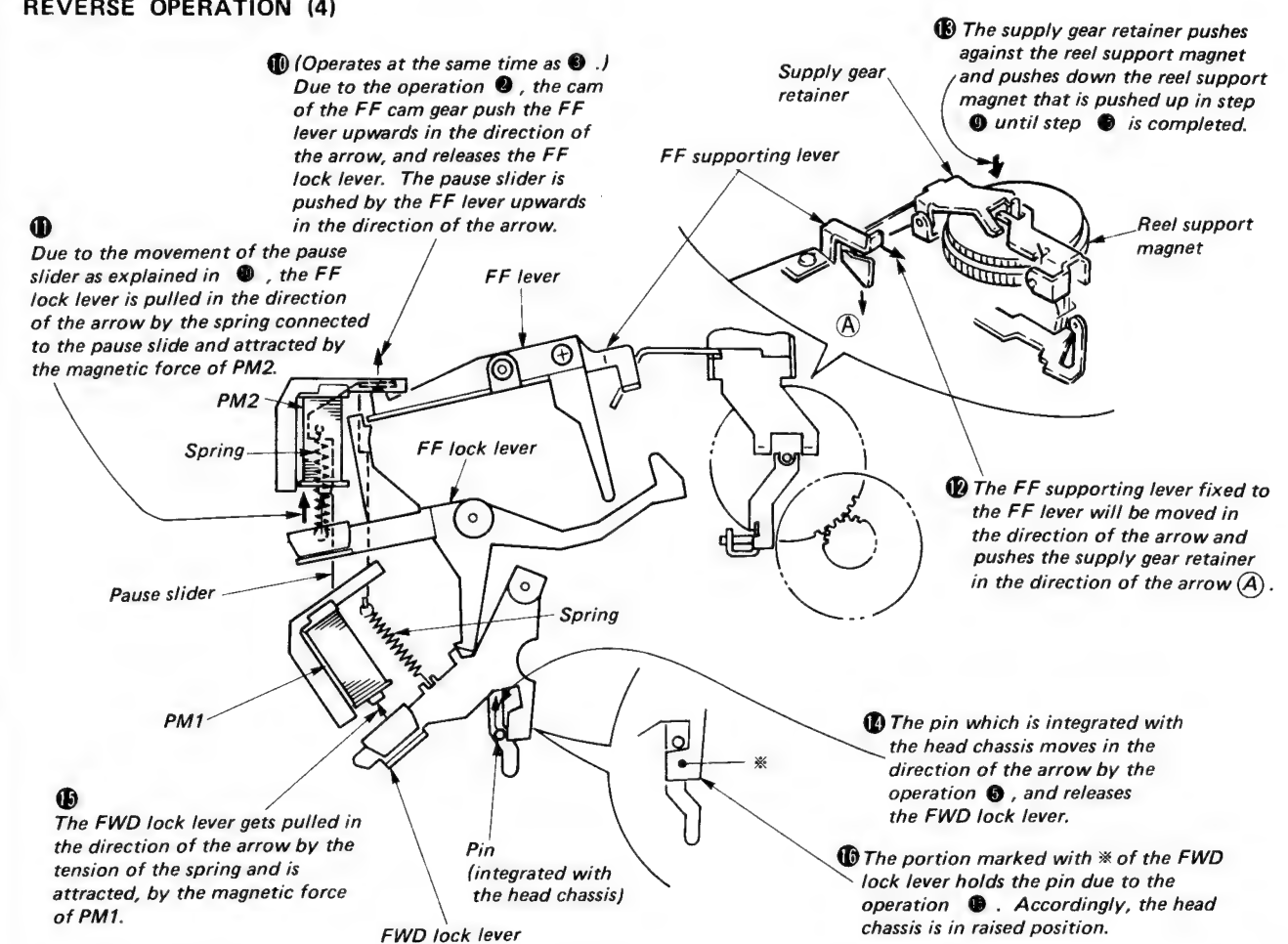
REVERSE OPERATION (2)



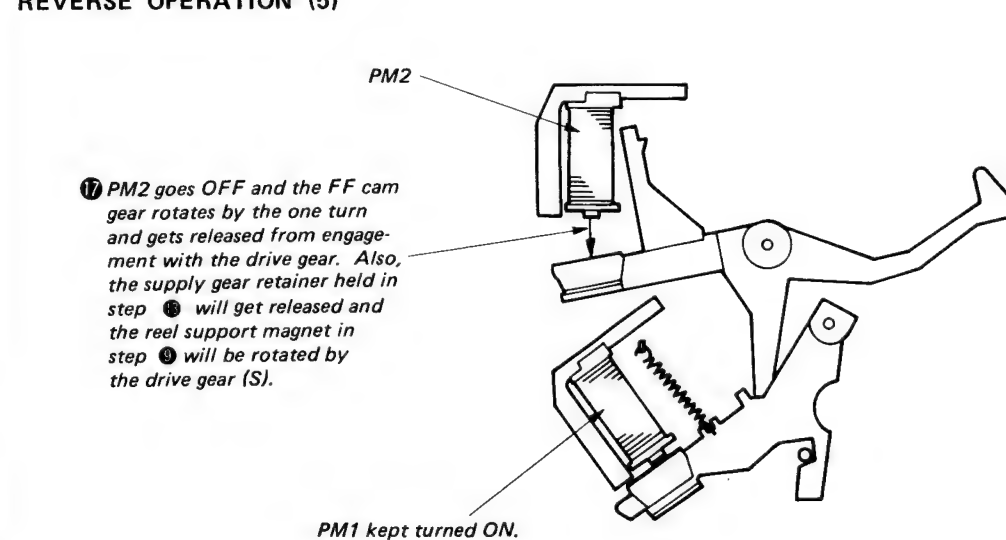
REVERSE OPERATION (3)



REVERSE OPERATION (4)



REVERSE OPERATION (5)



REVERSE OPERATION (6)



—TC-34—

REV MODE

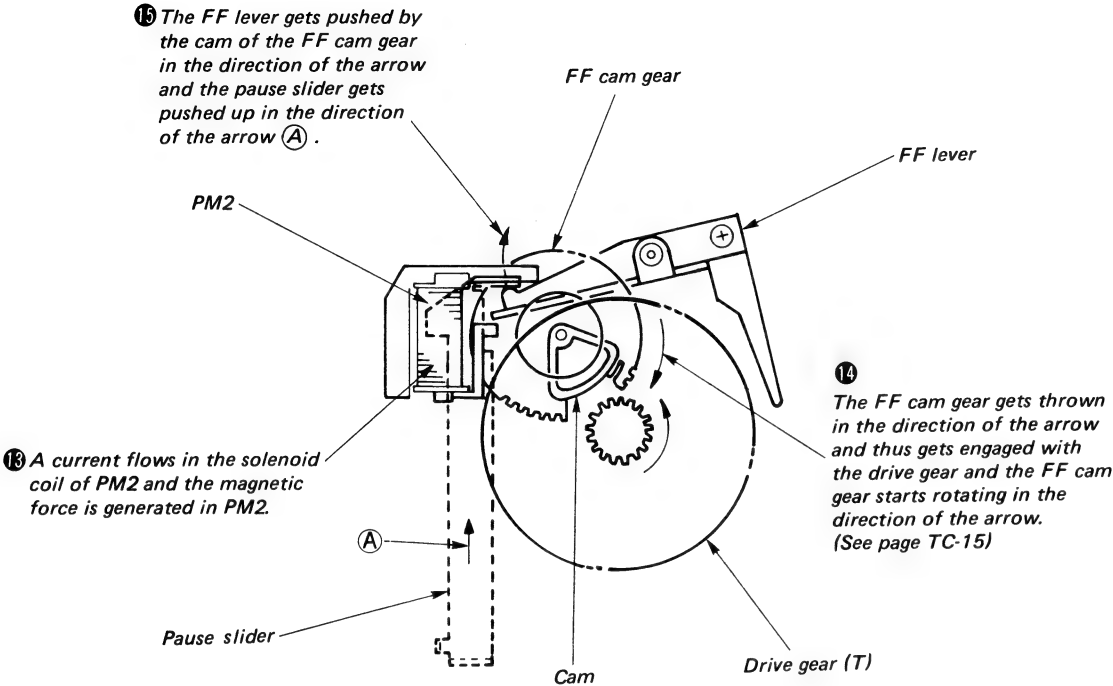
- 10



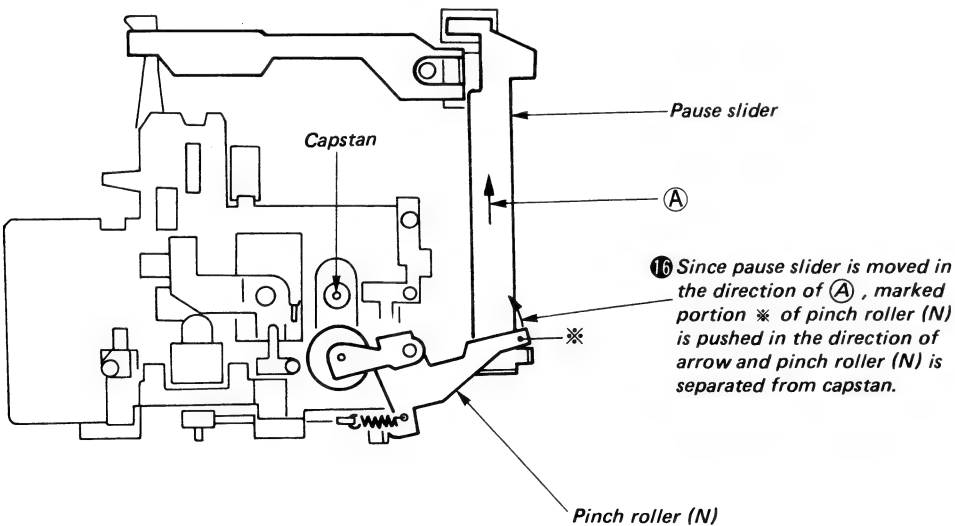
MECHANISM OPERATION

Operation of ❶ — ❷ : See “Operation of FWD mode” on page TC23 — 24.

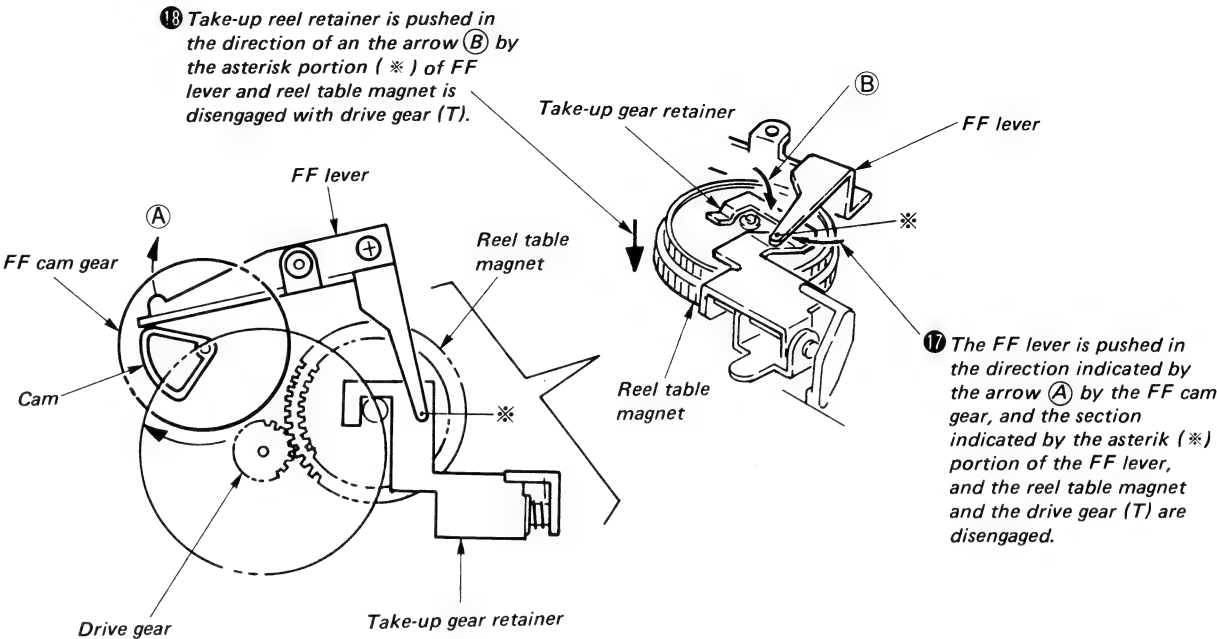
FWD AMS OPERATION (5)



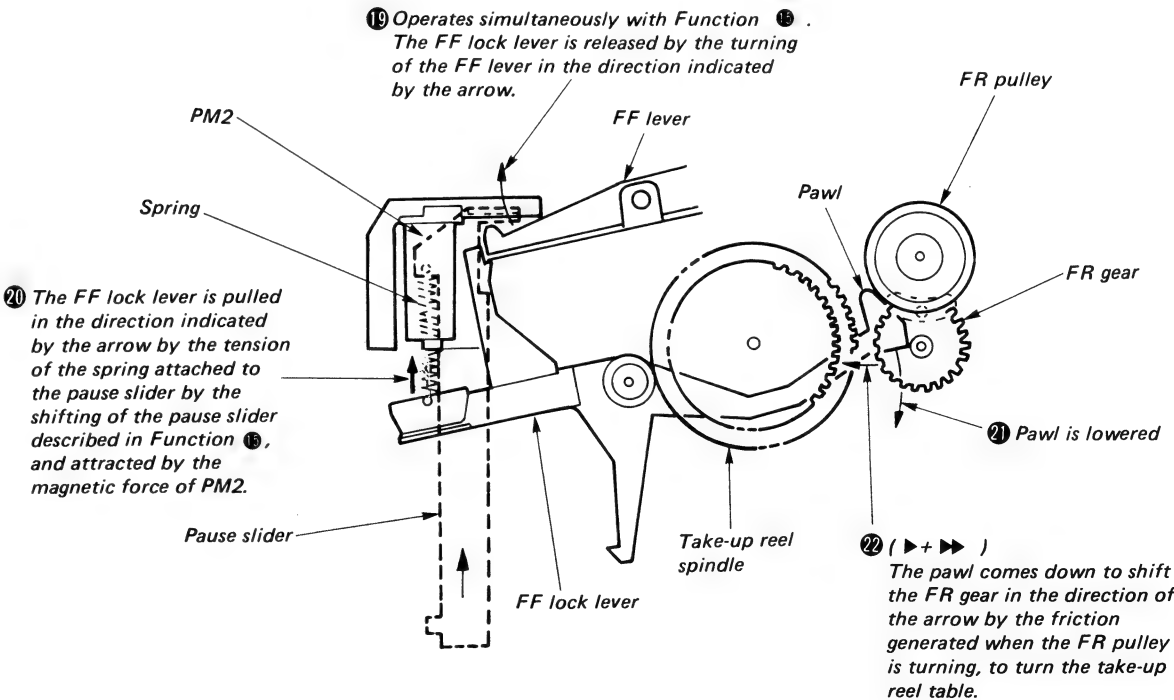
FWD AMS OPERATION (6)



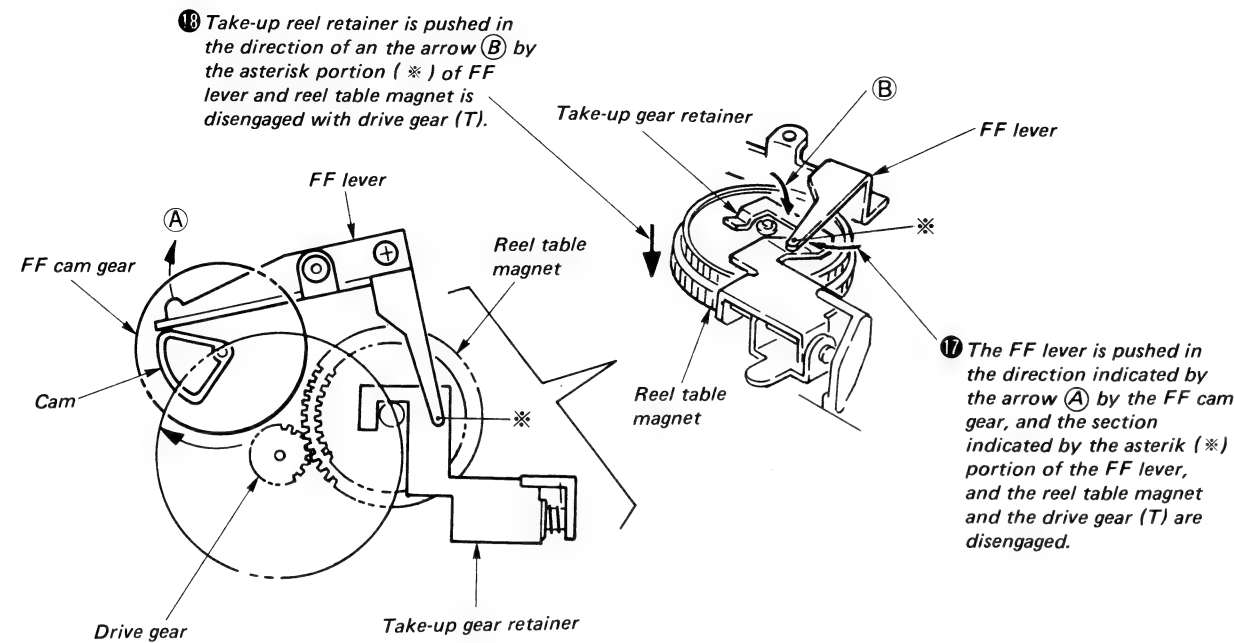
FWD AMS OPERATION (7)



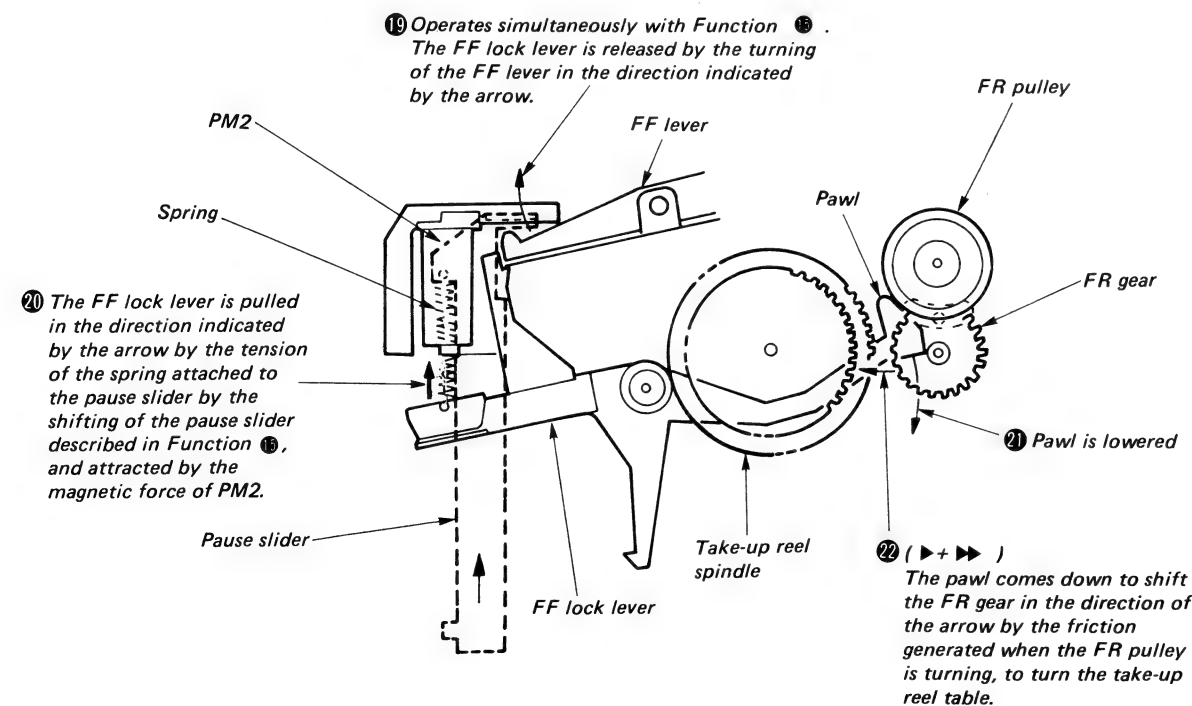
FWD AMS OPERATION (8)



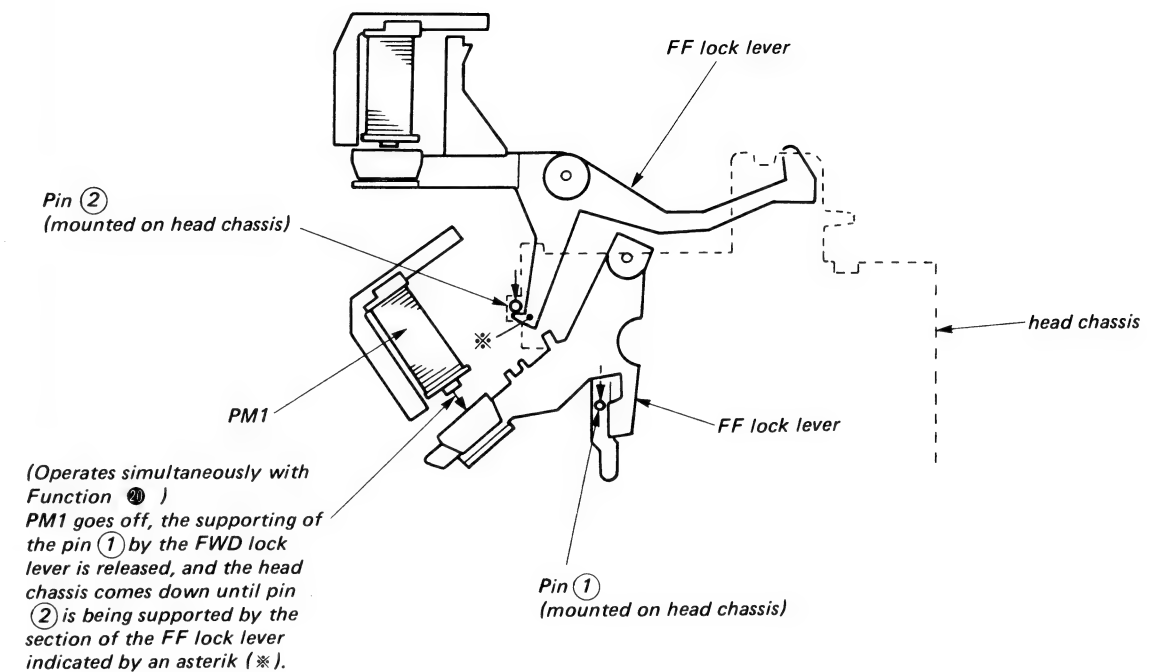
FWD AMS OPERATION (7)



FWD AMS OPERATION (8)

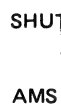


FWD AMS OPERATION (9)



FWD AMS MODE
(▶+▶▶) (▶+◀◀)

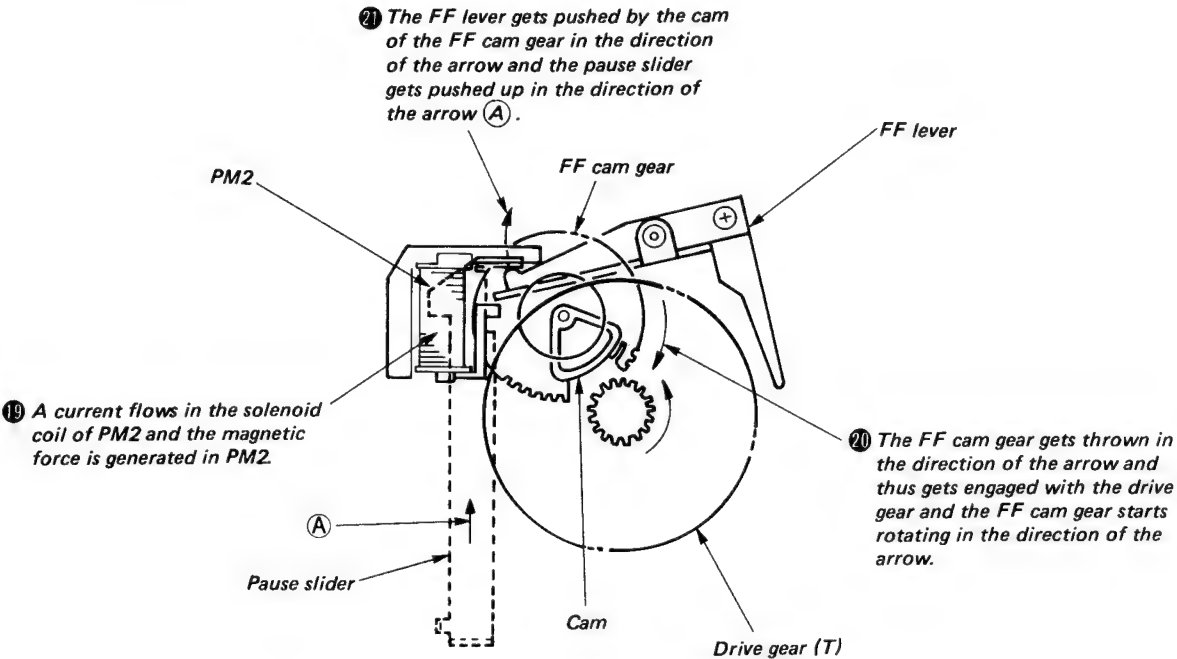
- 2-8. REV**
STOP
(AMS
STOP



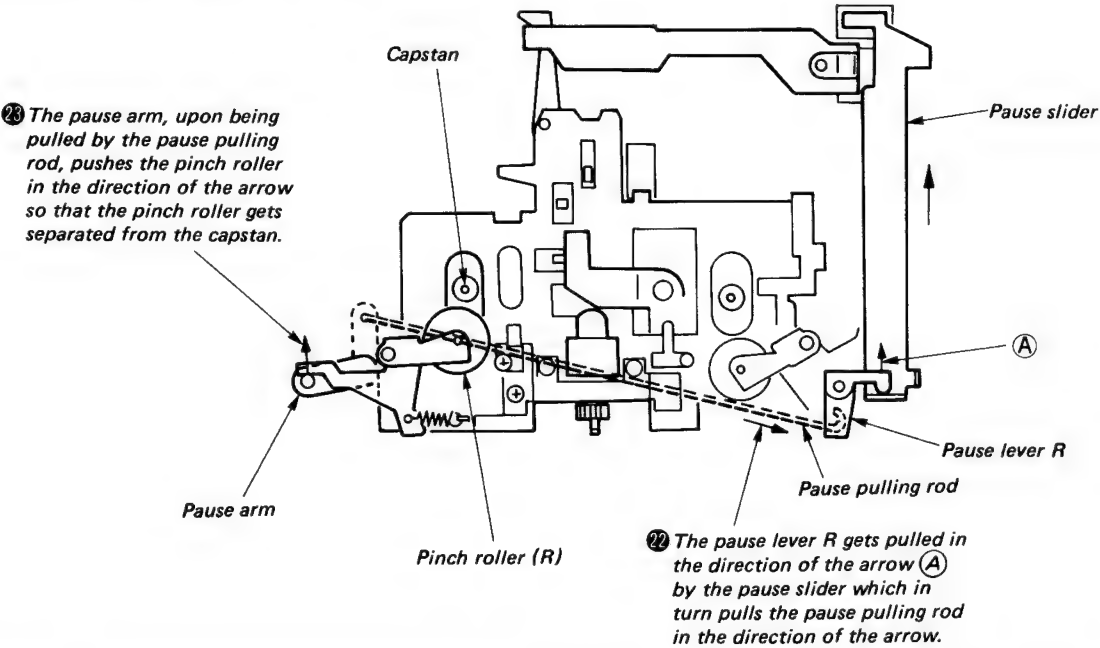
• MECHANICAL OPERATION

Operation of ① – ⑱ : See “Operation of REV mode” on page TC31 – 34.

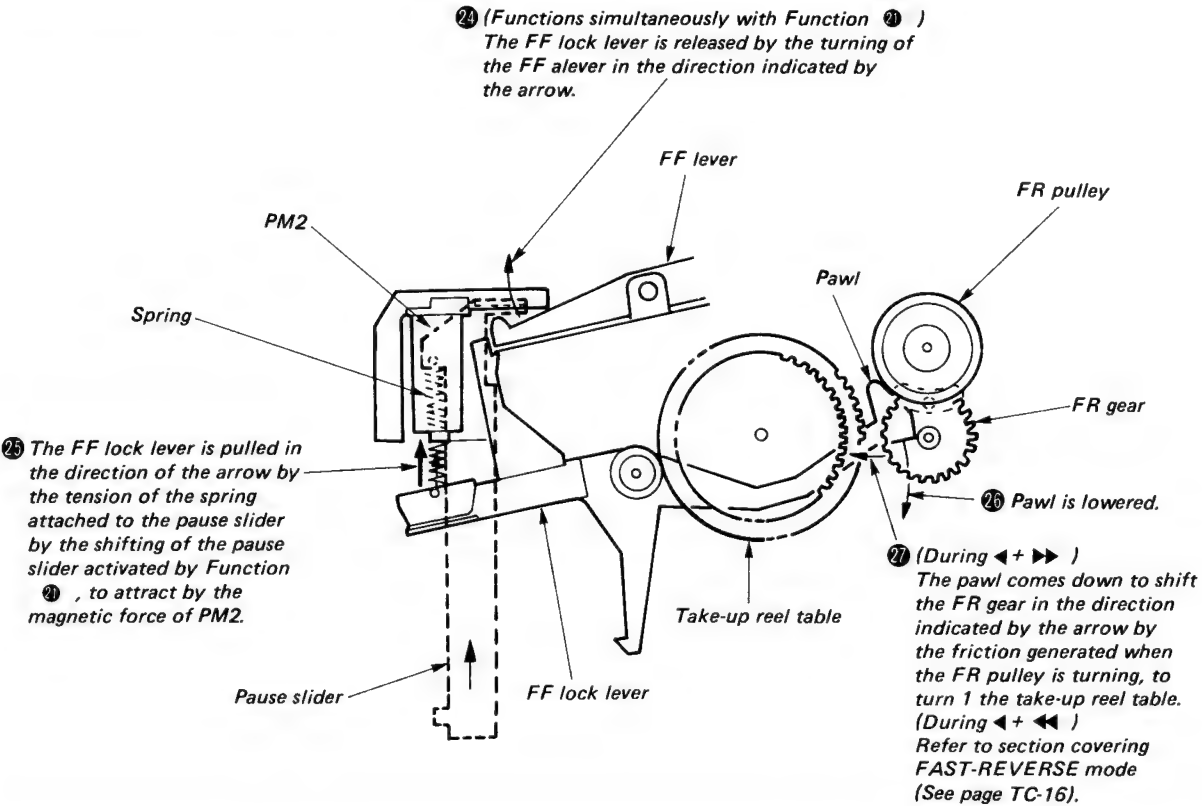
REVERSE AMS OPERATION (7)



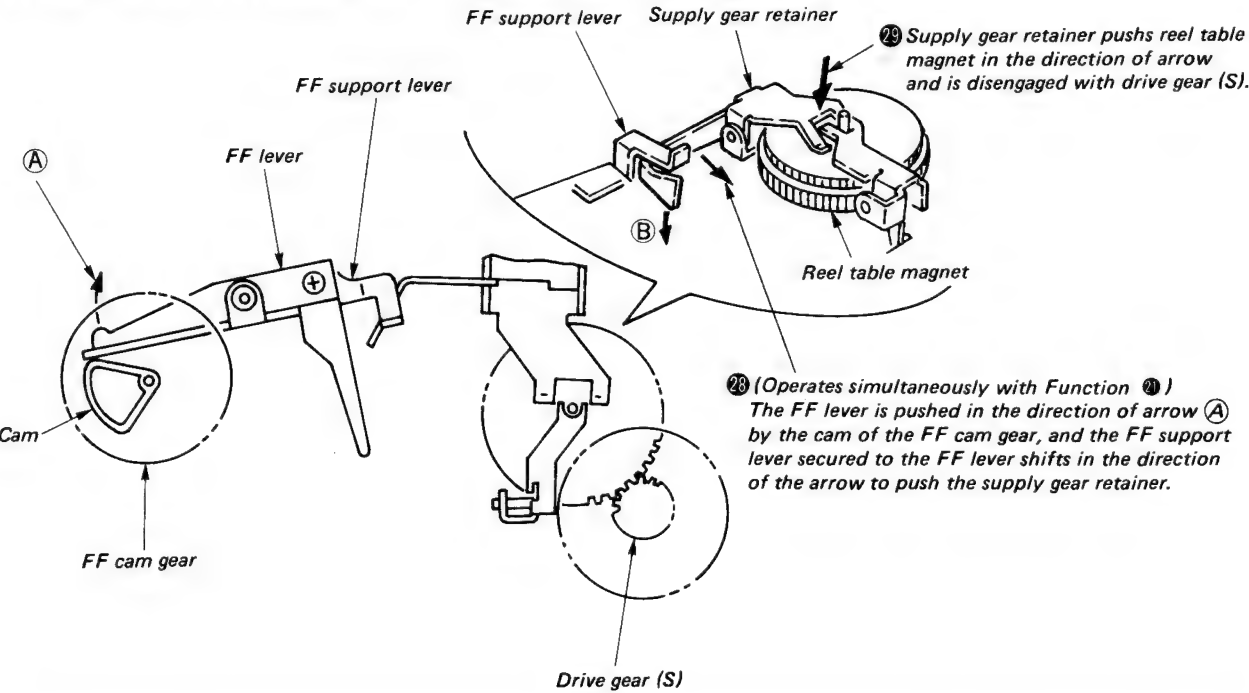
REVERSE AMS OPERATION (8)



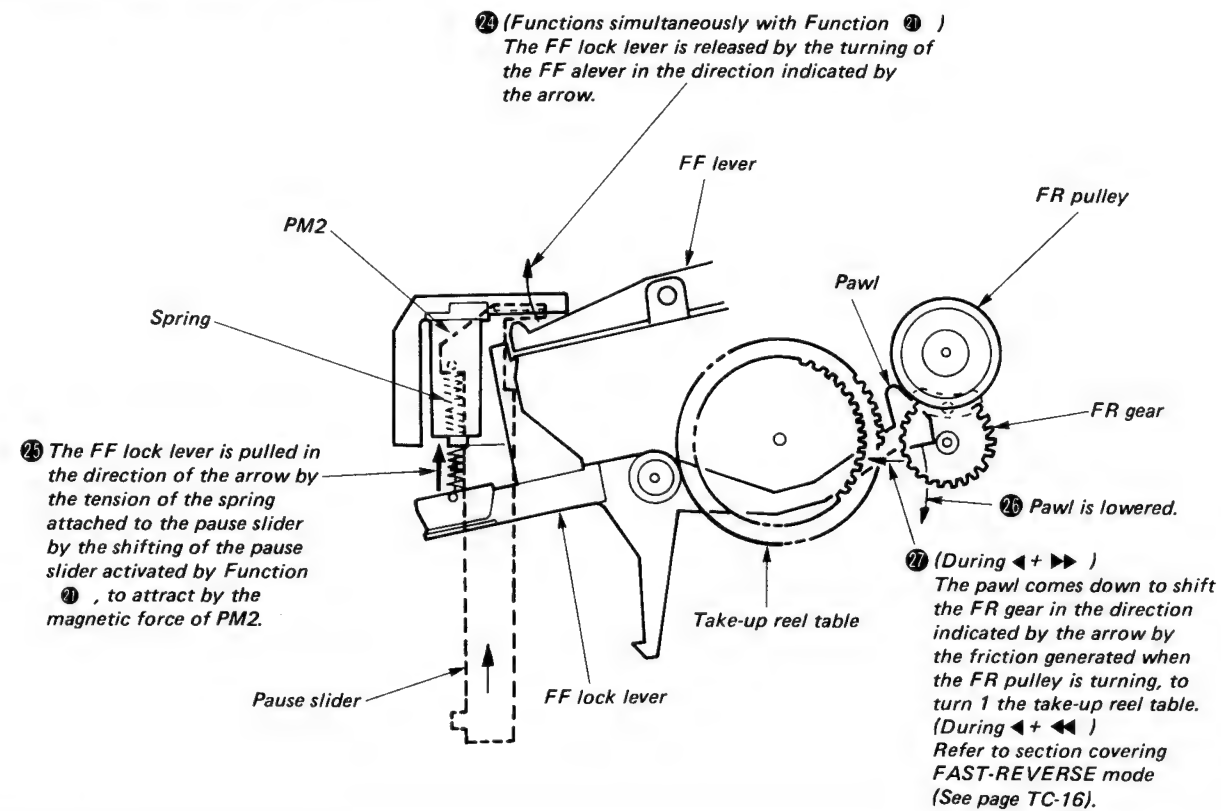
REVERSE AMS OPERATION (9)



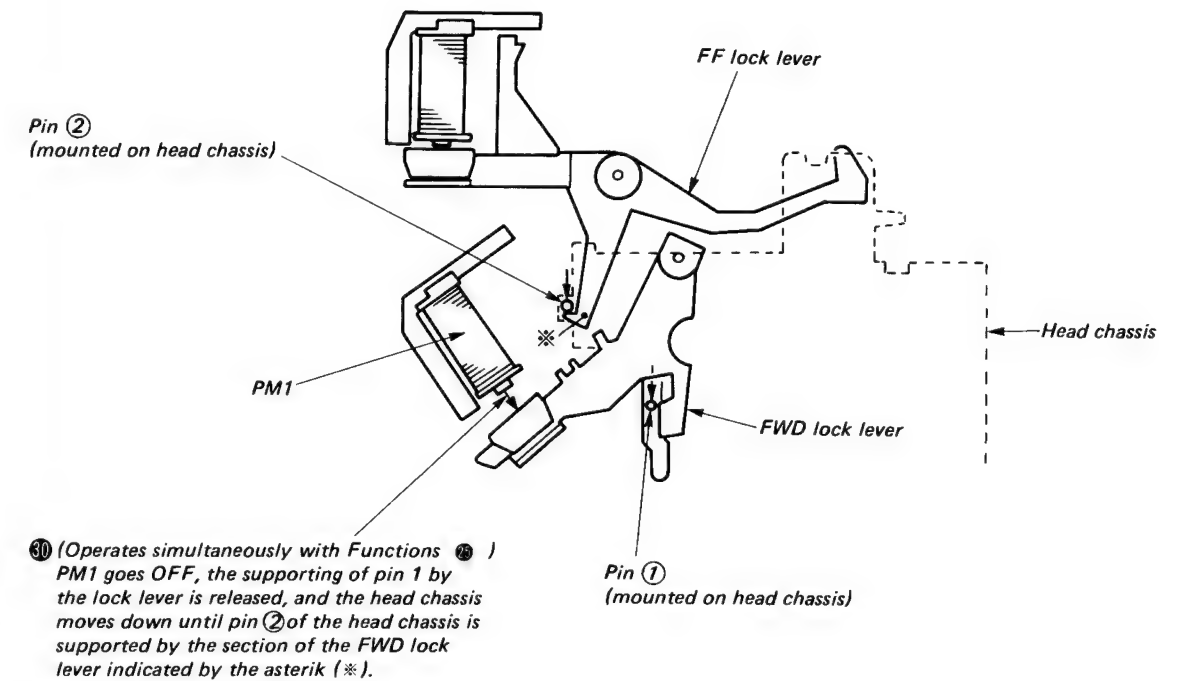
REVERSE AMS OPERATION (10)



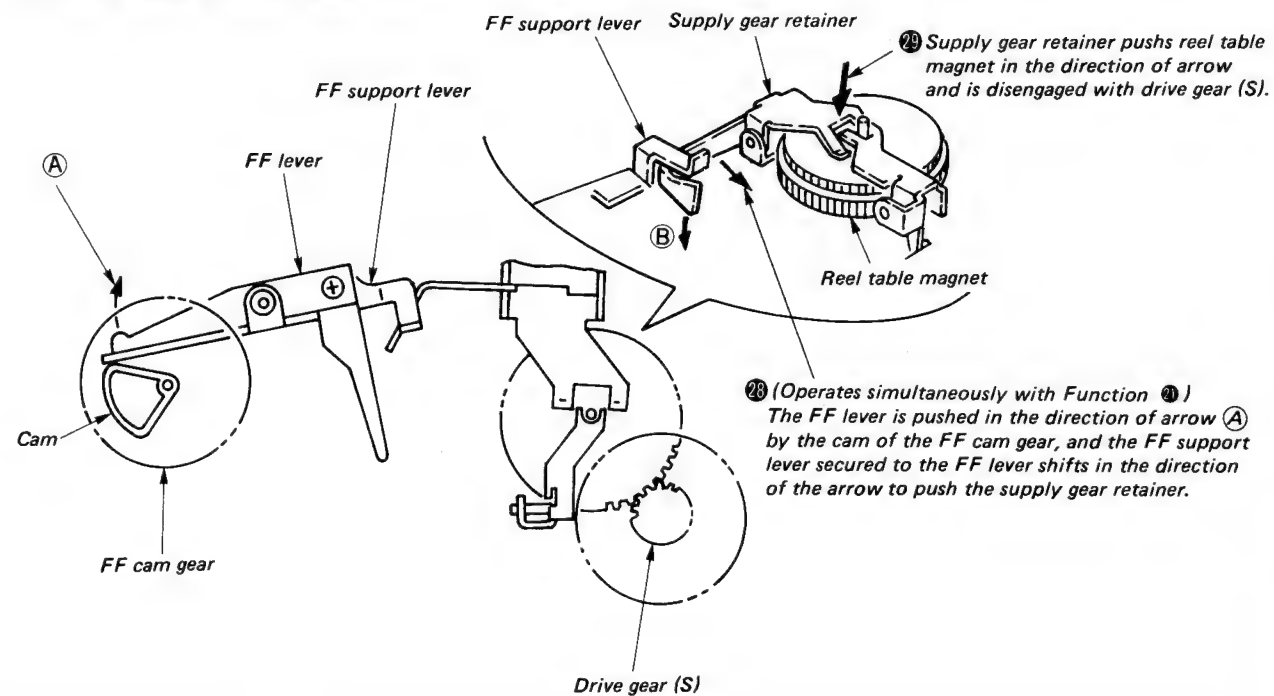
REVERSE AMS OPERATION (9)



REVERSE AMS OPERATION (11)



REVERSE AMS OPERATION (10)

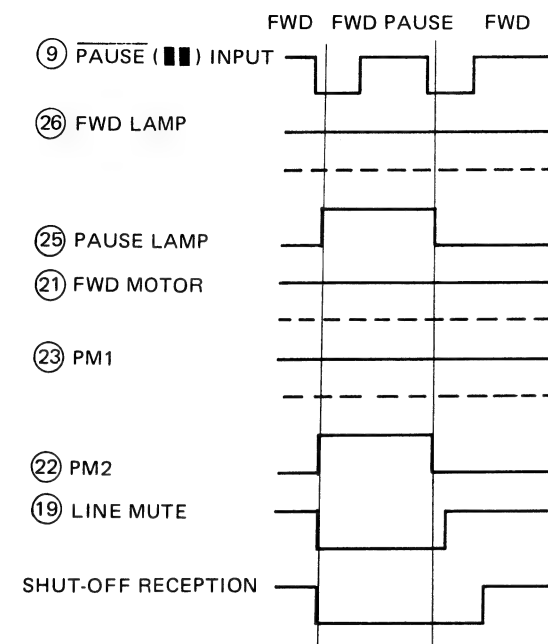


2-9. FWD PAUSE MODE

(When pushing pause switch at FWD mode)

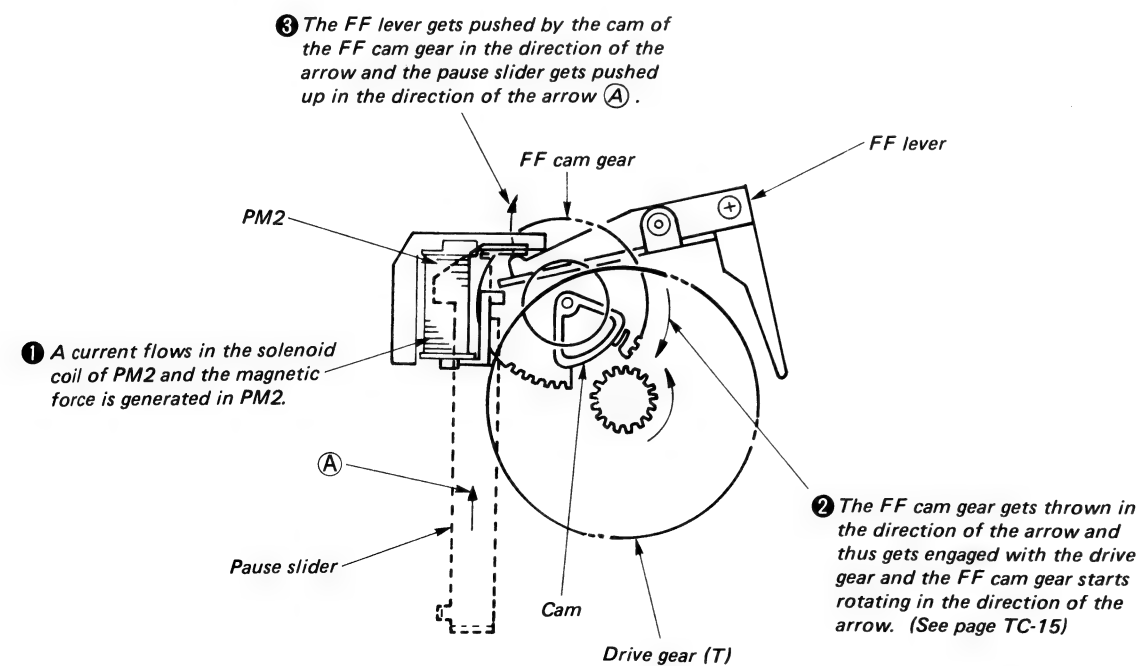
• TIMING OF IC401

FWD ←→ FWD PAUSE

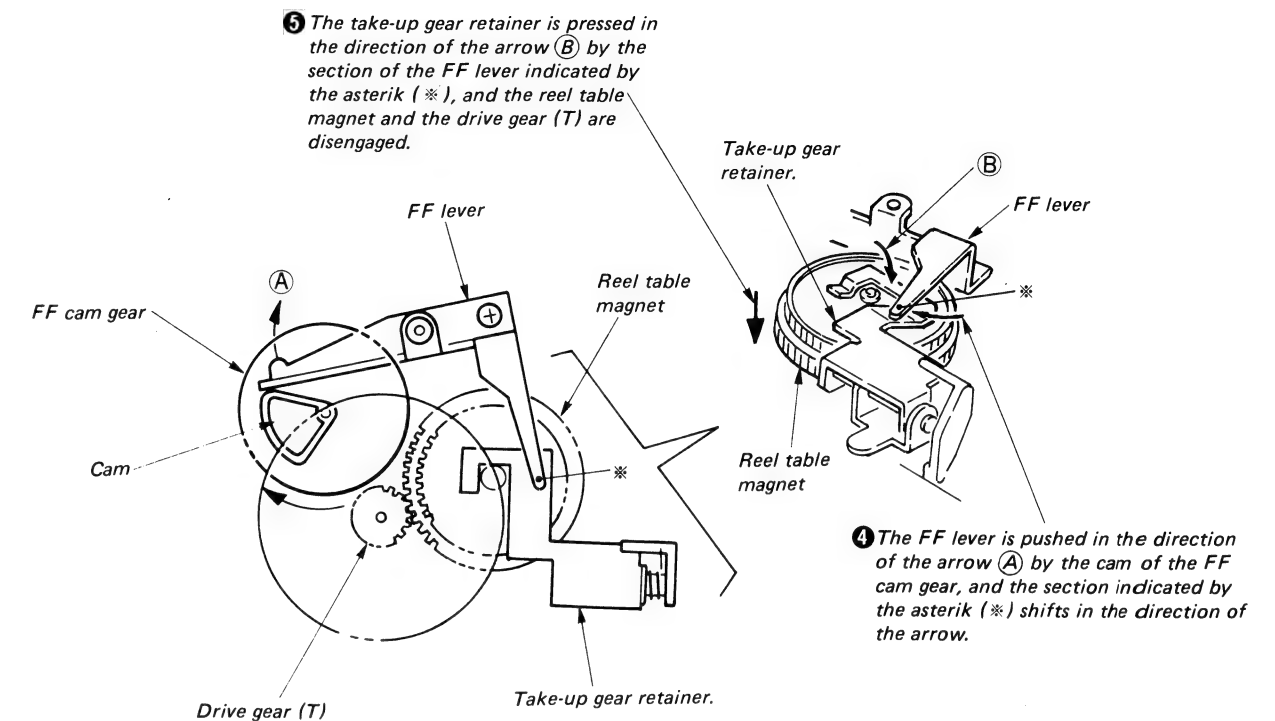


• MECHANISM OPERATION

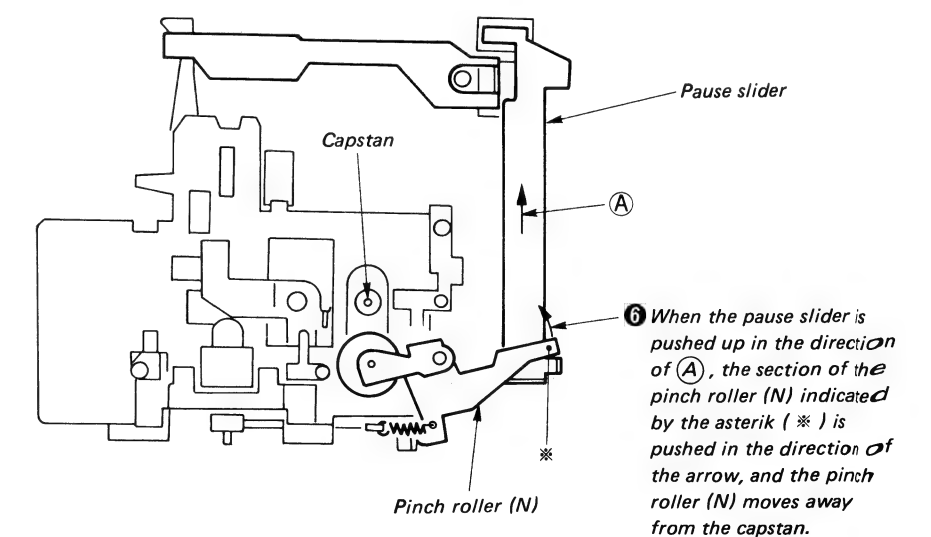
FWD PAUSE OPERATION (1)



FWD PAUSE OPERATION (2)



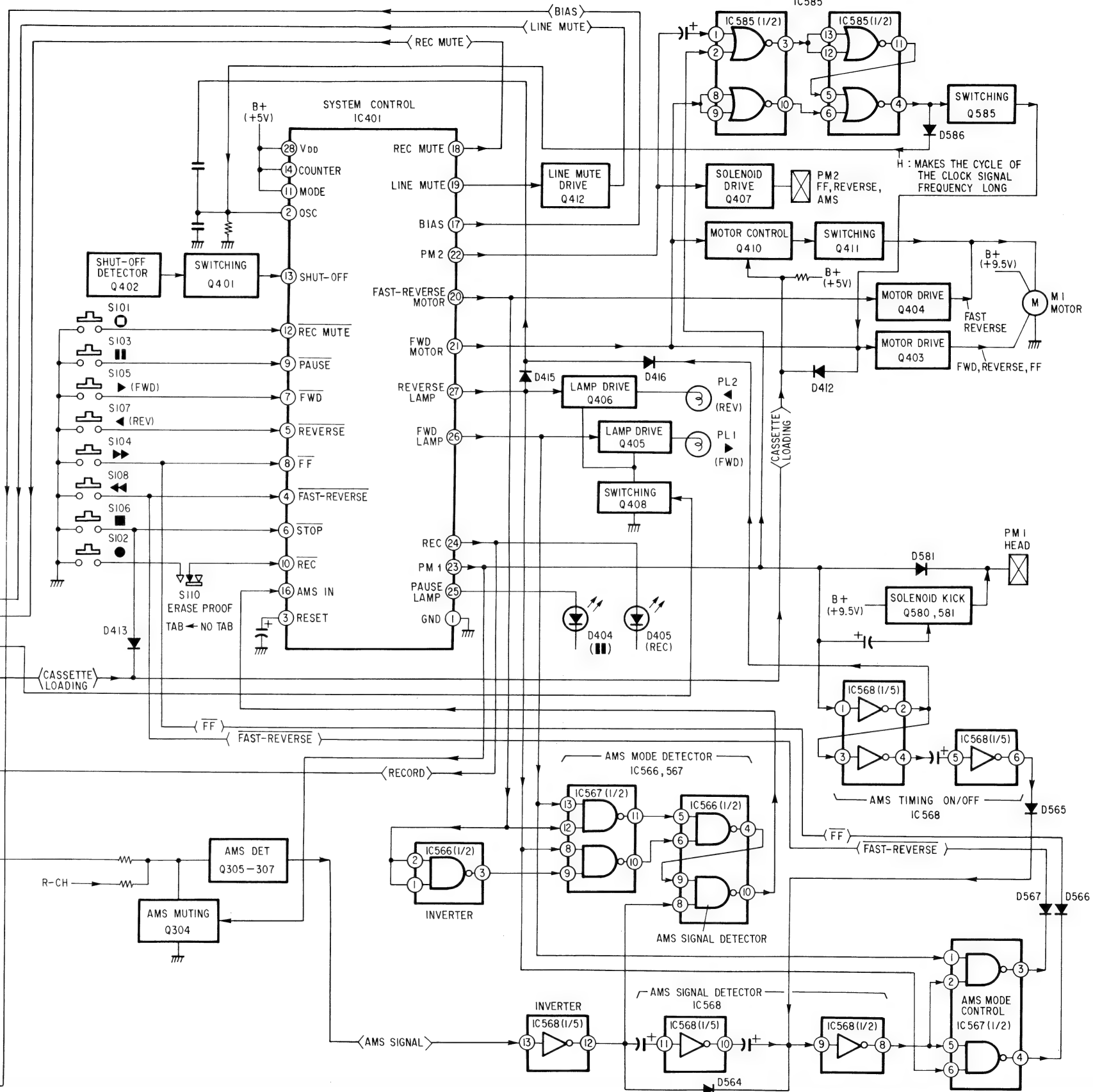
FWD PAUSE OPERATION (3)



FWD PAUSE MODE
(FWD→ PAUSE)

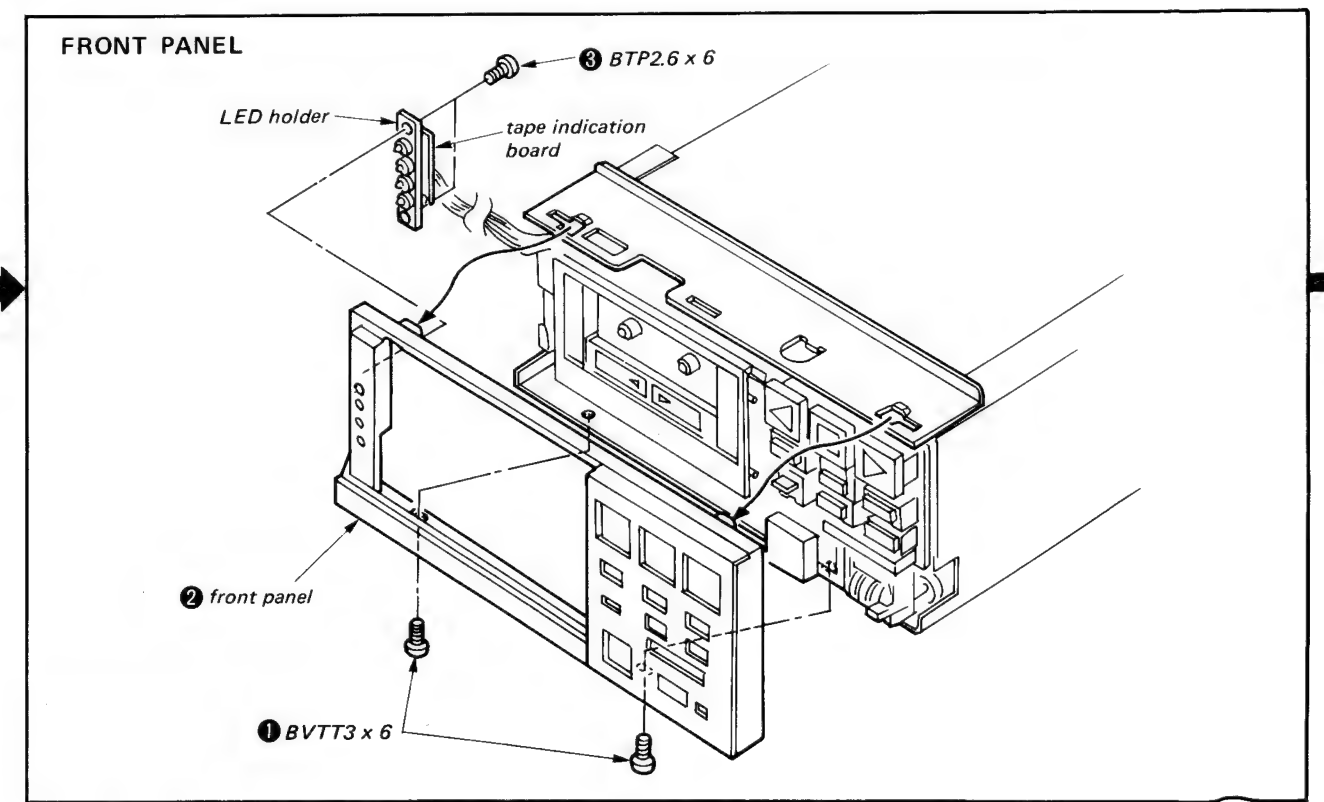
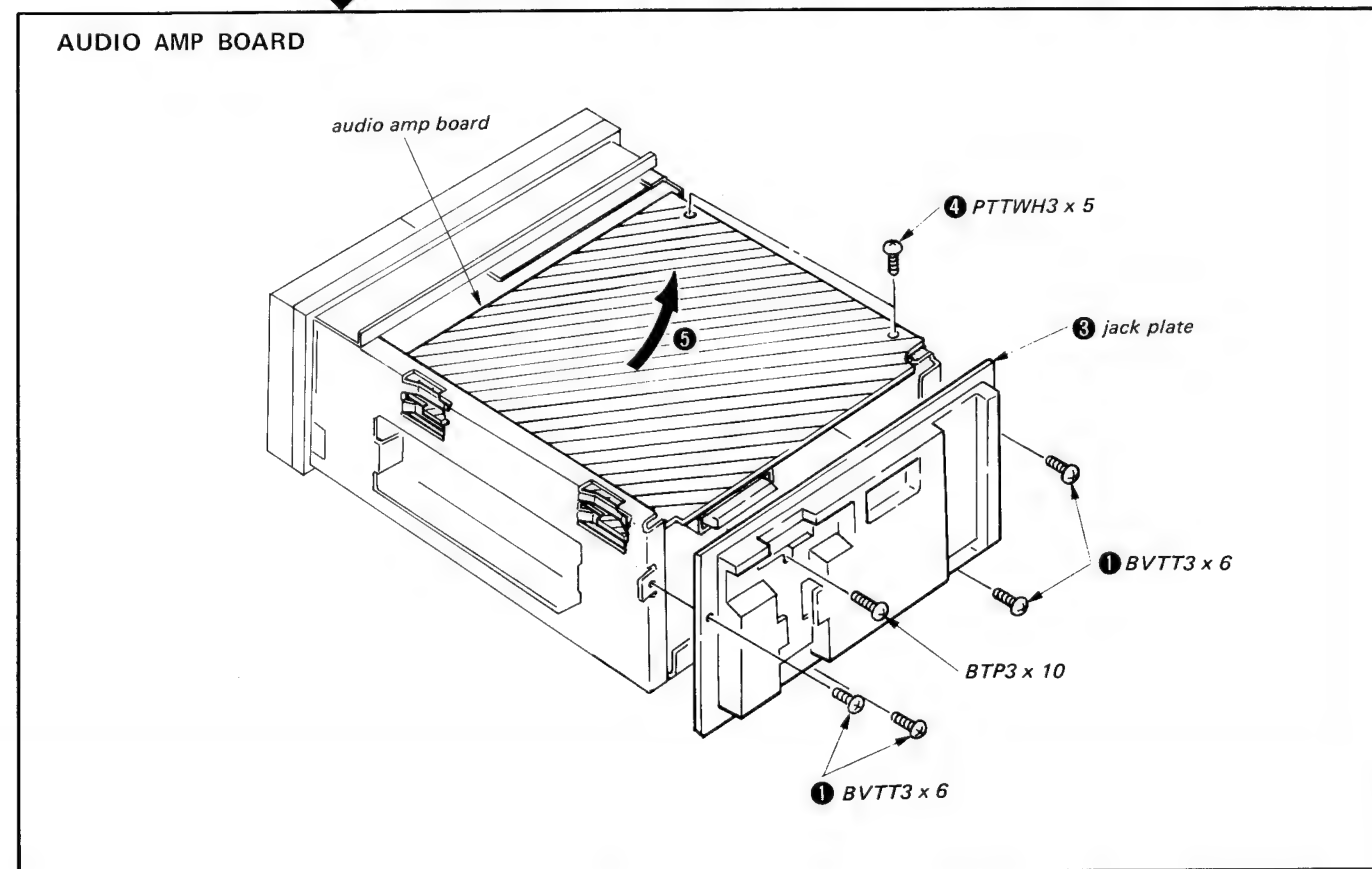
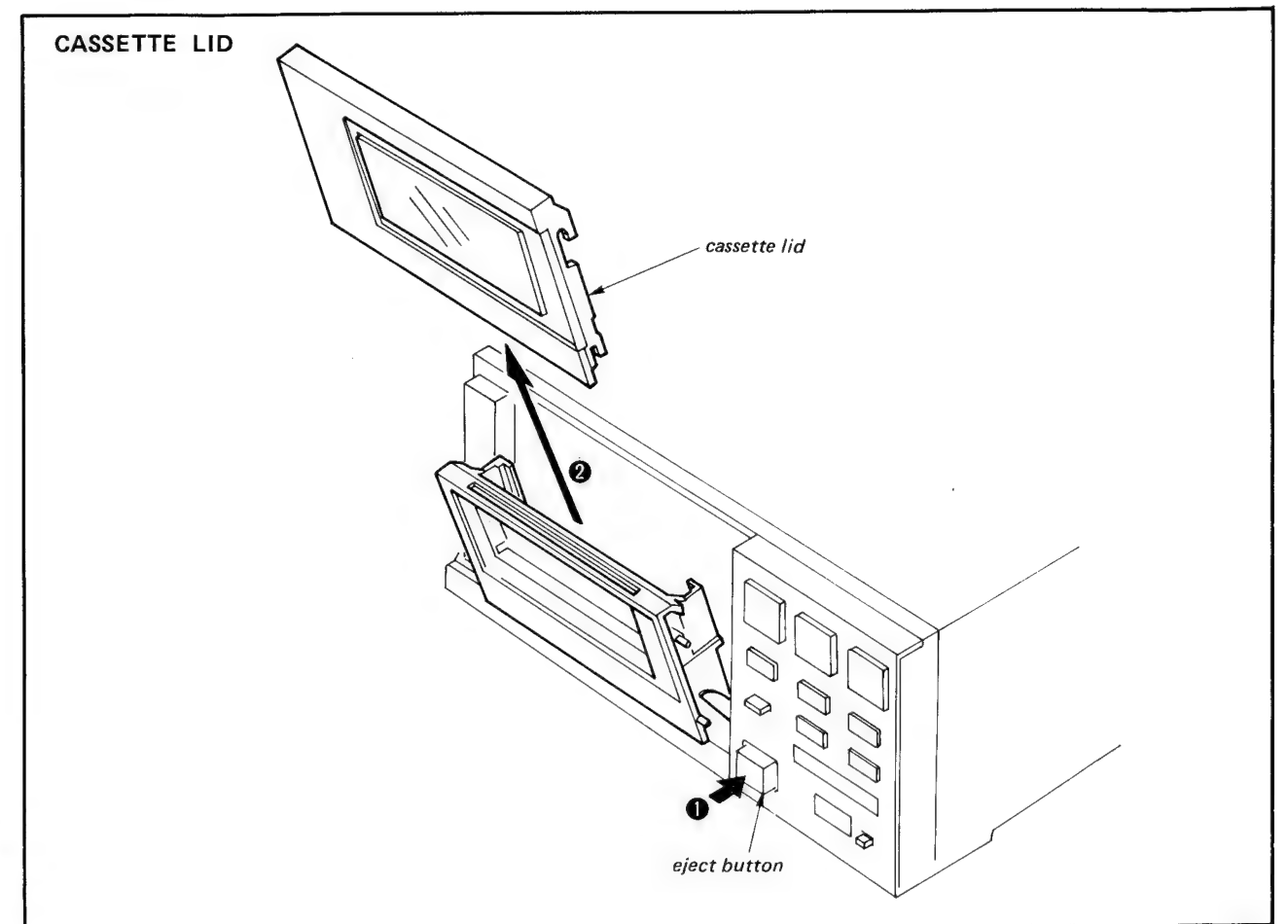
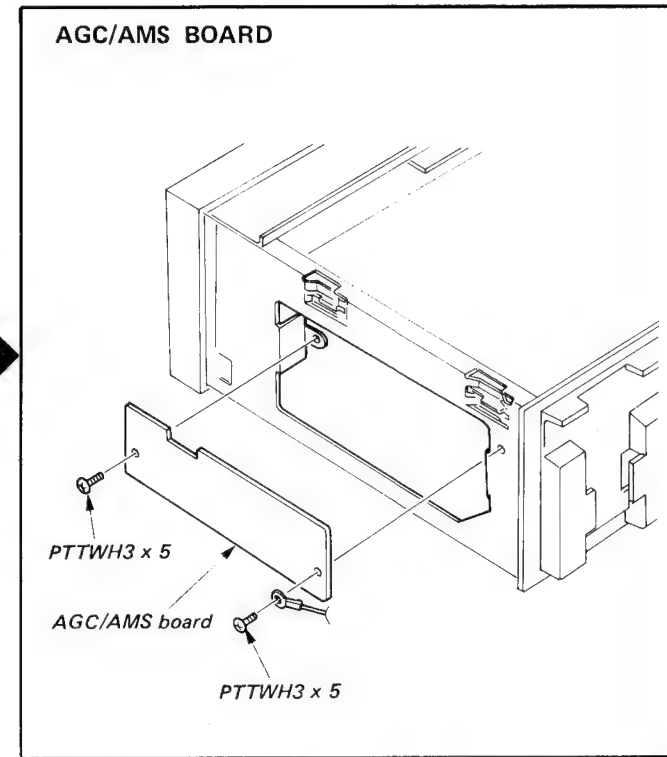
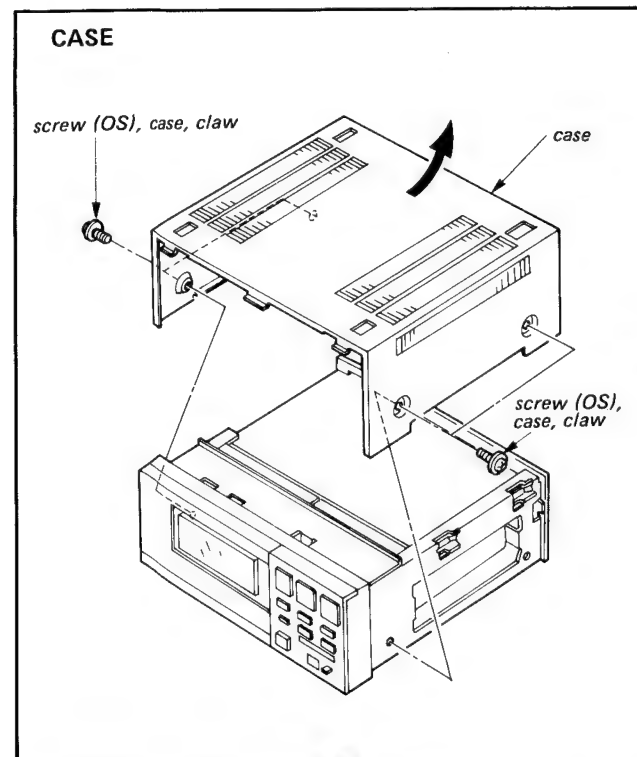


- SAME AS L-CH
(REFERENCE NUMBERS ARE CODED)
(FROM 200.

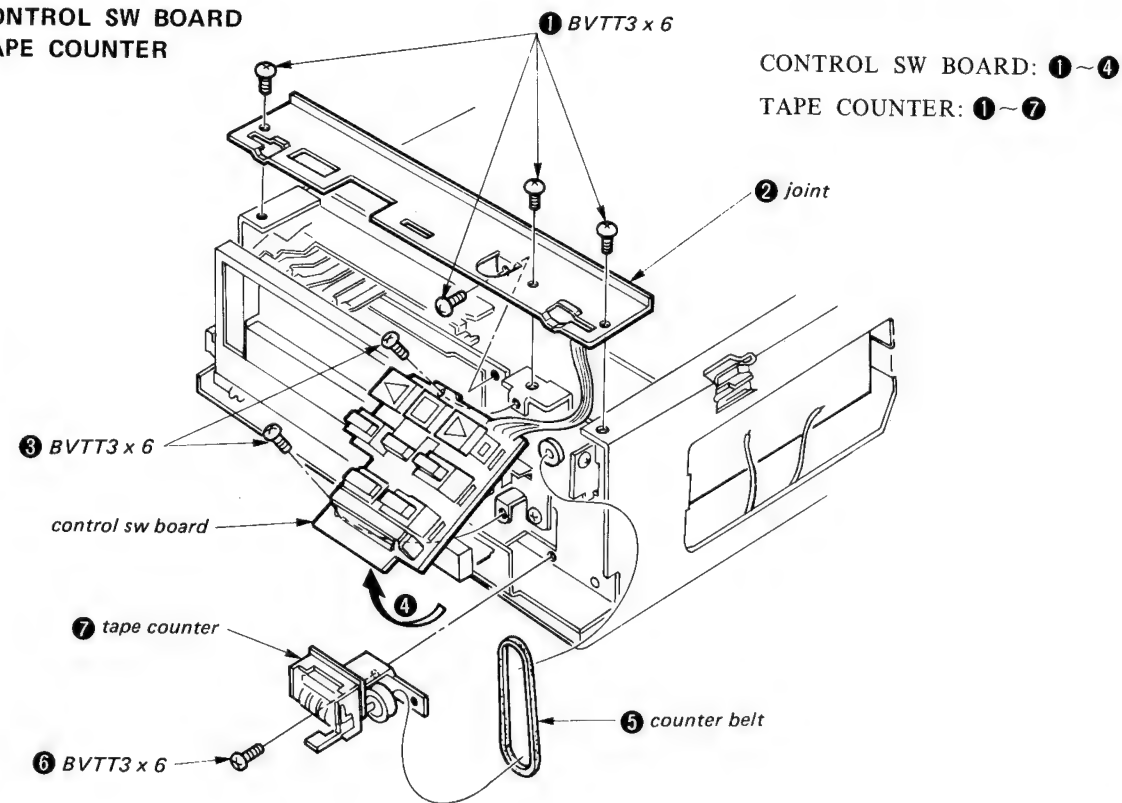


SECTION 4 DISASSEMBLY

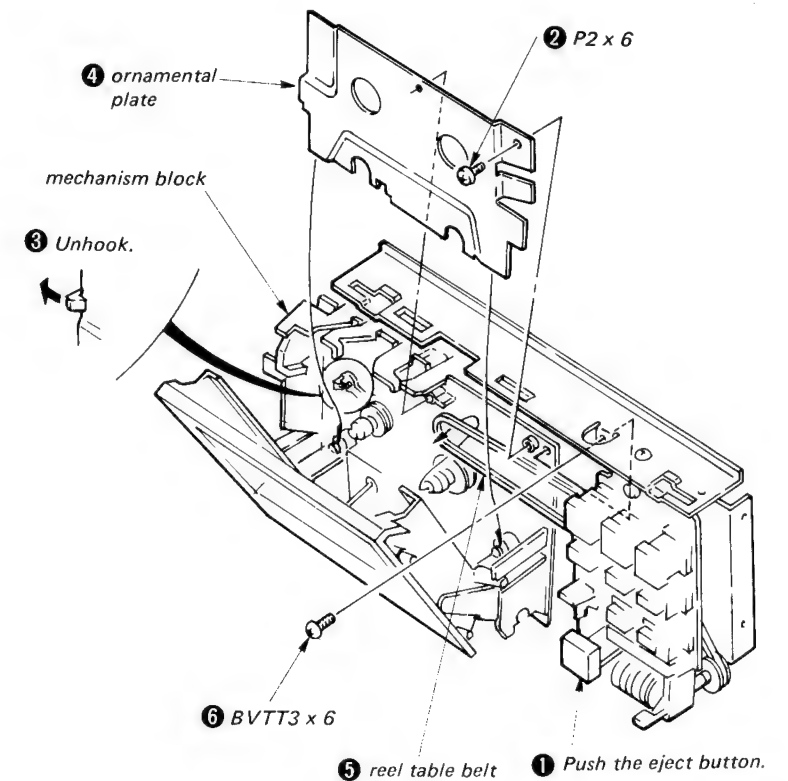
Note: Follow the disassembly procedure in the numerical order given.



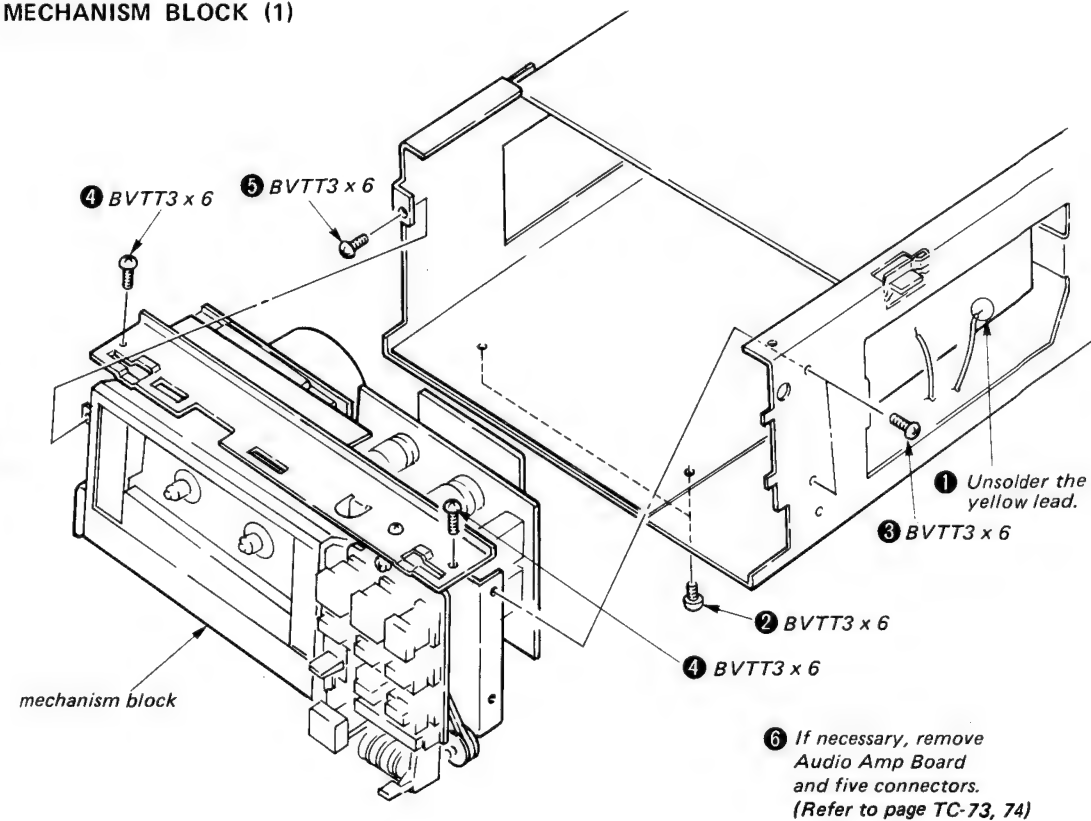
CONTROL SW BOARD
TAPE COUNTER



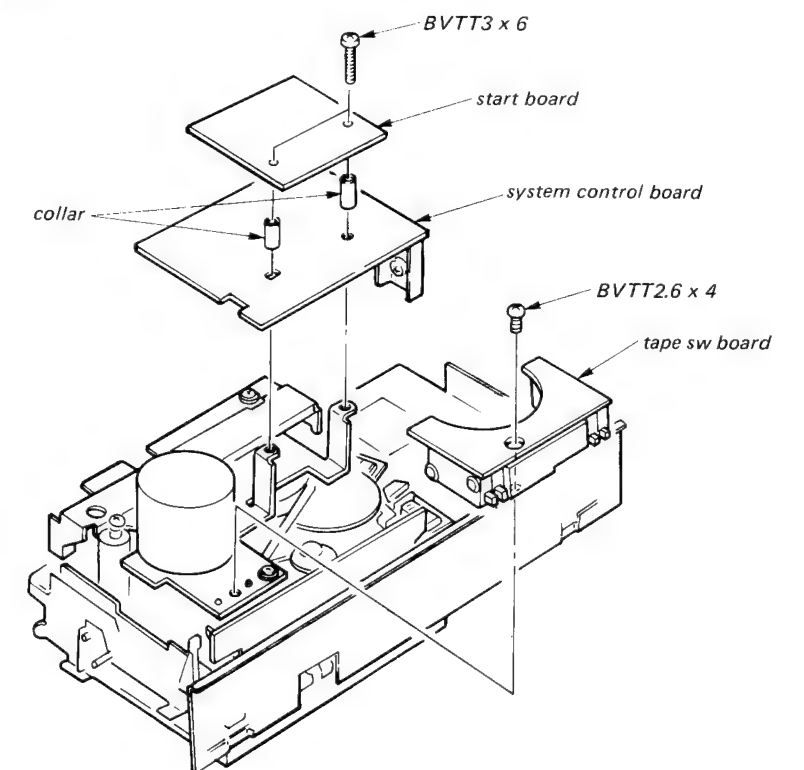
MECHANISM BLOCK (2)



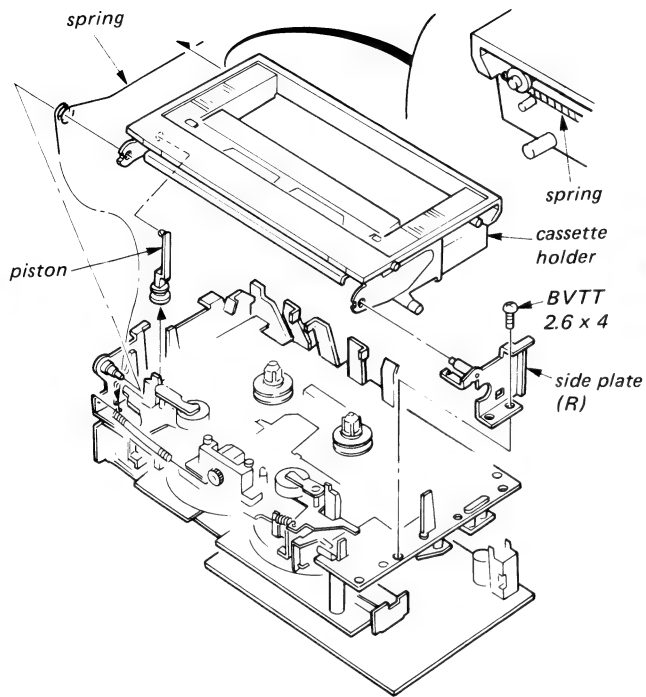
MECHANISM BLOCK (1)



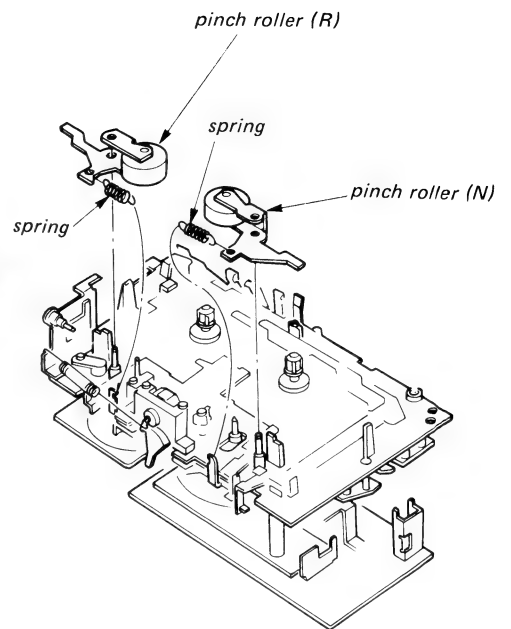
TAPE SW BOARD, START BOARD, SYSTEM CONTROL BOARD



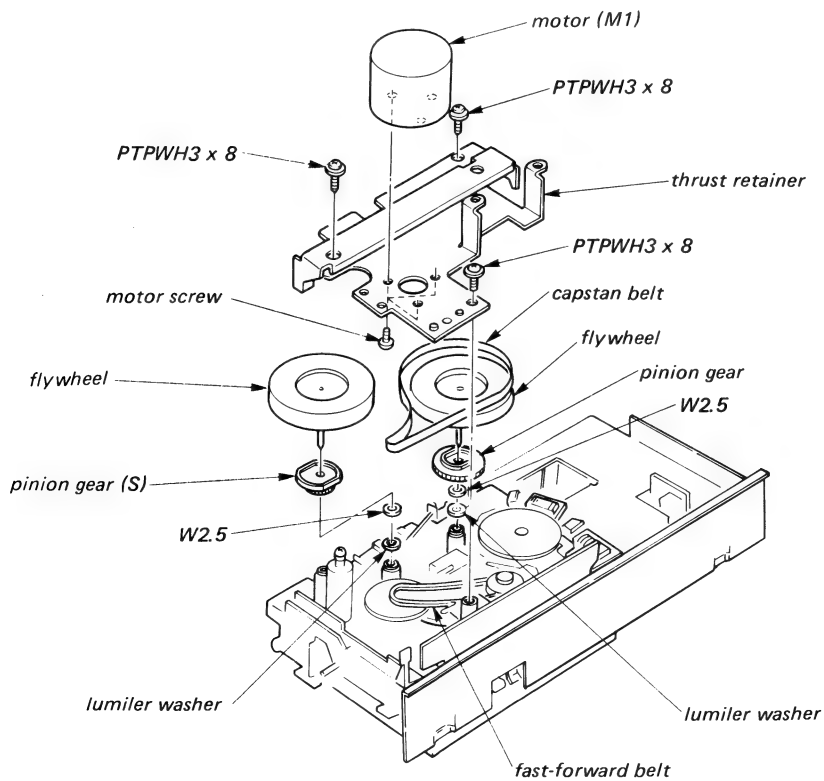
CASSETTE HOLDER



PINCH ROLLER



MOTOR, FLYWHEEL



SECTION 5

ADJUSTMENTS

5-1. MECHANICAL ADJUSTMENTS

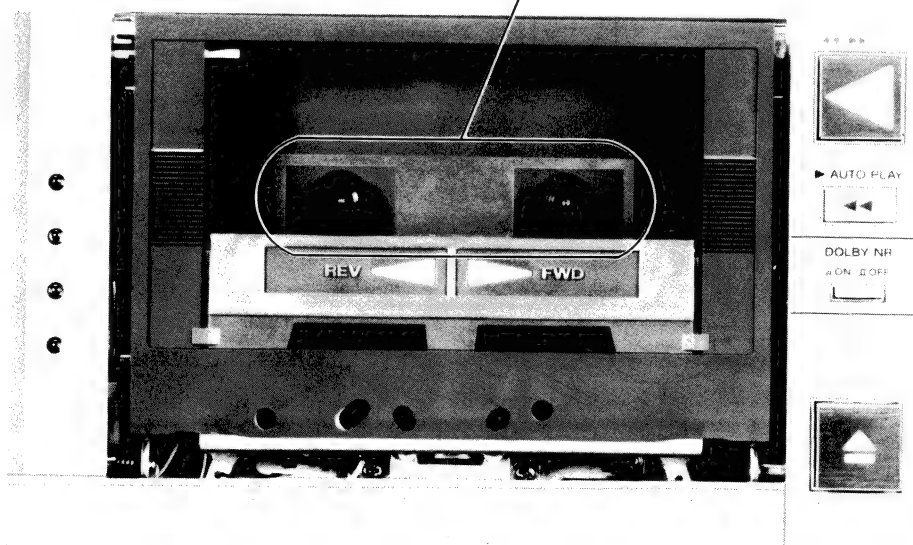
PRECAUTION

1. Clean the following parts with a denatured-alcohol-moistened swab:

record/playback head	pinch roller
erase head	rubber belts
capstan	idlers
2. Demagnetize the record/playback head with a head demagnetizer.
3. Do not use a magnetized screwdriver for the adjustments.
4. After the adjustments, apply suitable locking compound to the parts adjusted.
5. The adjustments should be performed with the rated power supply voltage (dc 2.5V) unless otherwise noted.

Torque Measurement

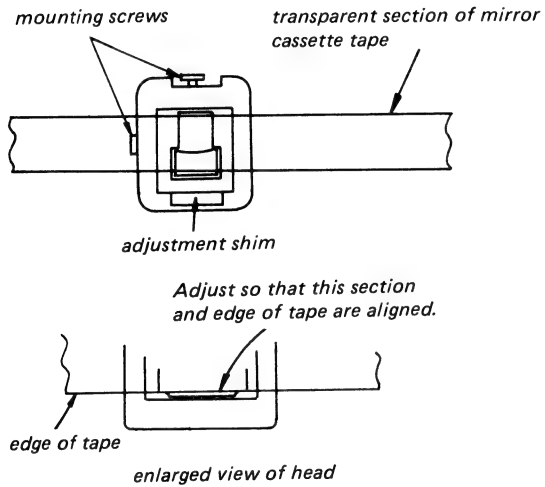
Torque	Torque meter	Meter reading
FWD	CQ-102C	28 – 60 g·cm (0.39 – 0.83 oz·inch)
FWD Back tension	CQ-102C	2 – 8 g·cm (0.03 – 0.1 oz·inch)
REV	CQ-102R	28 – 60 g·cm (0.39 – 0.83 oz·inch)
REV Back tension	CQ-102R	2 – 8 g·cm (0.03 – 0.1 oz·inch)
FF, REW	CQ-201B	80 – 165 g·cm (1.1 – 2.28 oz·inch)



Head Height Adjustment

The following adjustments should be made when the record/playback head is replaced.

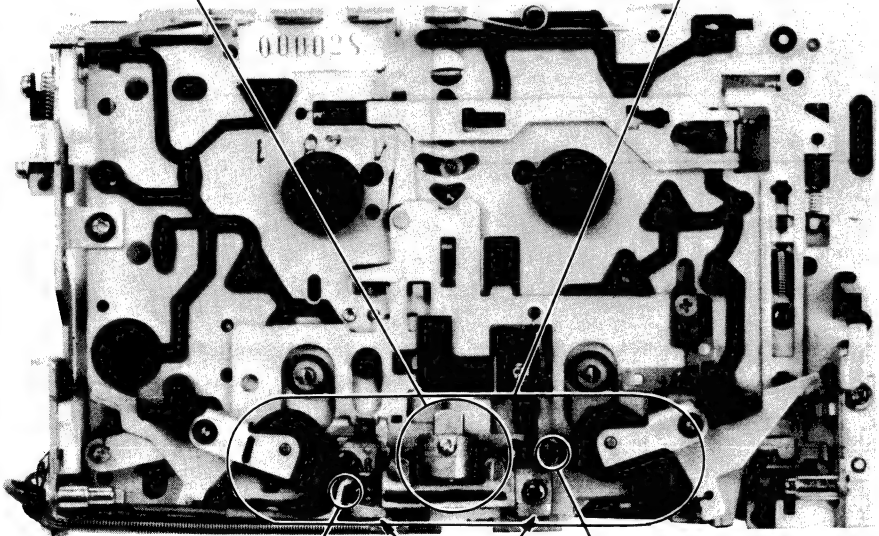
1. The head should be made after removing the head pad of the mirror cassette tape.
2. Using the leader section of the mirror cassette tape, adjustments are made by changing the adjusting shim so that the core and the edge of the tape become as shown in the illustration below when the tape is moved across the head.



Tape Path Adjustment

When assembling the erase head and head holder, and when replacing the tape guide (L), be sure to perform the following adjustments.

1. Using a mirror cassette, adjust each of the adjustment screws until there is not tape curling.
2. Perform adjustments by changing the height adjustment shim of the head holder assembly and the height adjustment shim of the record/playback head, so that the core of the record/playback head is positioned correctly for both FWD and REV.



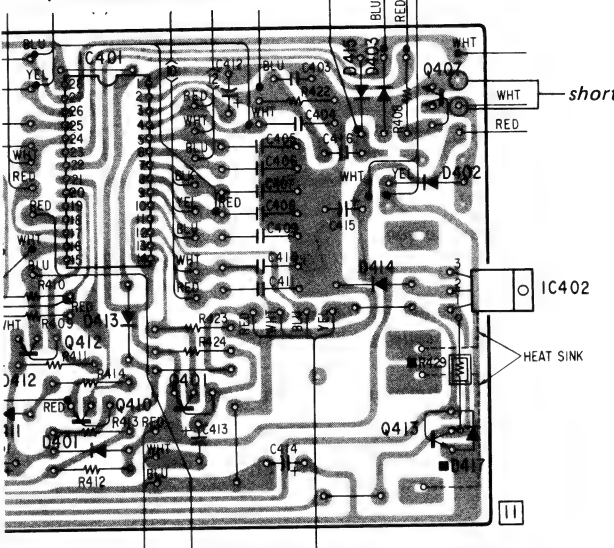
erase head tape pass adjustment screw
head holder assy height adjustment shim
tape guide adjustment screw

Supply Gear Retainer Position Adjustment

1. With the deck in the REV mode, short the collector and emitter of Q407 (this will place the deck in the pause state of the REV mode).

2. Bend the FF supplementary lever at the place indicated by the asterik (*) to make adjustments so that the dimension of **A** is 1mm, ± 0.5 mm.
3. After completing this adjustment, remove the shorting wire.

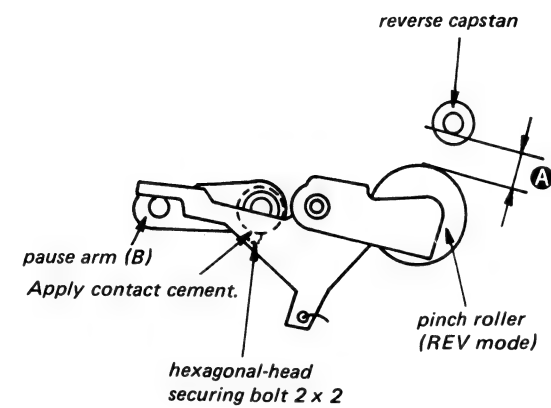
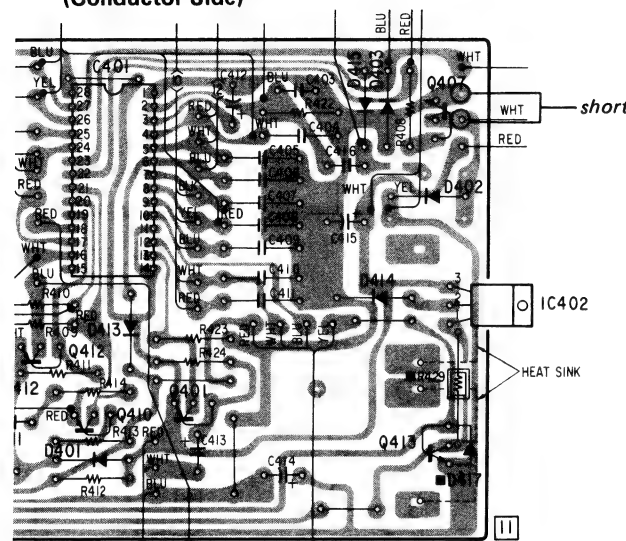
• System Control Board
(Conductor Side)



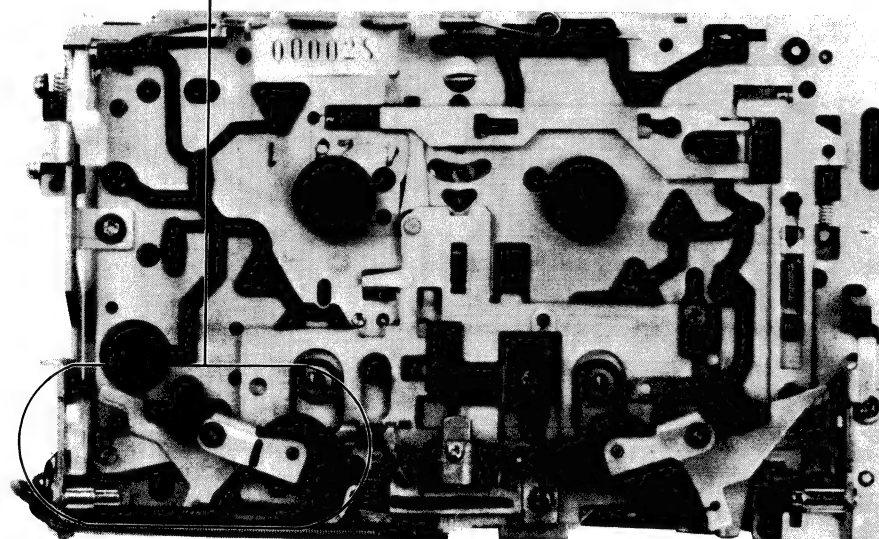
Pause Arm Position Adjustment

1. With the deck in the REV mode, short the collector and emitter of Q407 (this will place the deck in the pause state of the REV mode).
2. Loosen the hexagonal head securing bolts and adjust the position of the pause arm B so that the dimension of A below becomes 0.5mm – 1.0mm.

• System Control Board (Conductor Side)



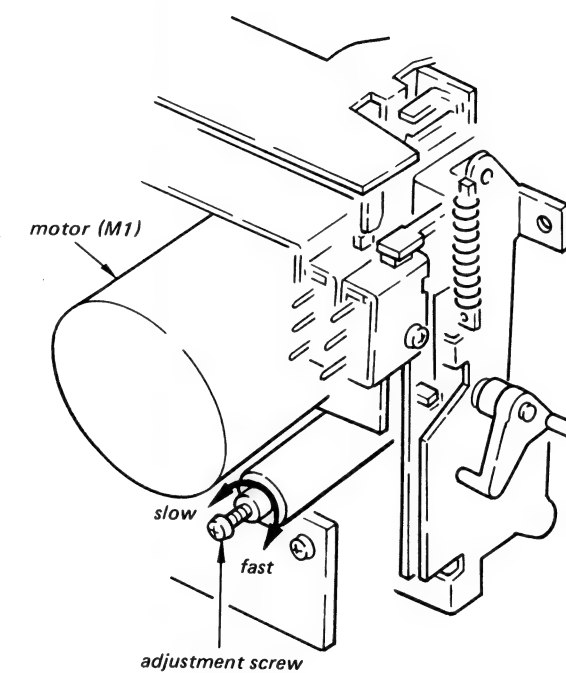
3. After the adjustment, lock the screws with contact cement.
4. After the adjustment, detach the shorting wire.



Cassette Holder Opening/Closing Speed Adjustment

1. Insert a CHF-90 or equivalent tape (in terms of weight).
2. Adjust the adjustment screw so that the time required for the cassette holder is 0.4 – 2.5 seconds when the EJECT button is depressed.

Adjustment Location:

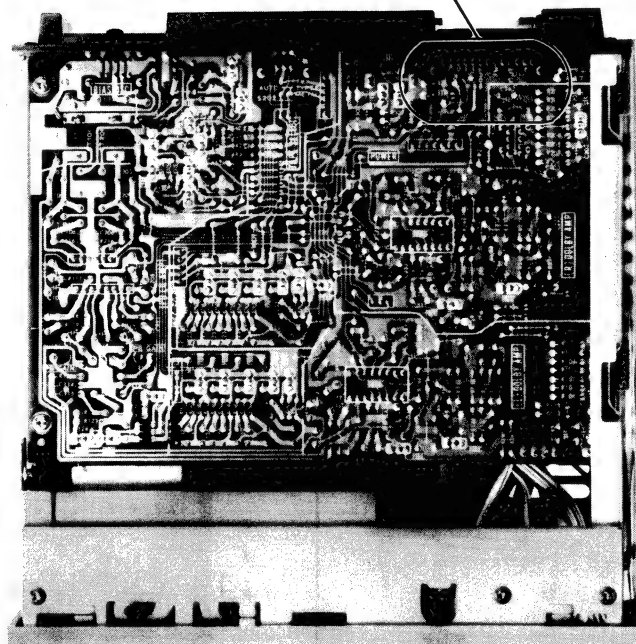
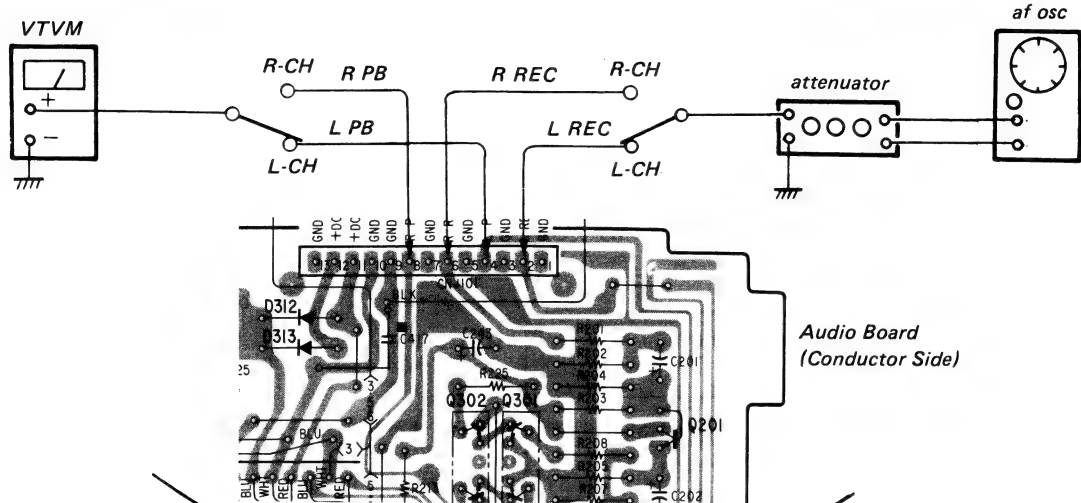


5-2. ELECTRICAL ADJUSTMENTS

Note: The adjustment should be performed in the order given in this service manual.
(Playback section may be adjusted earlier than record section.)
The adjustments should be performed for both L-CH and R-CH.

- Output level check point

- Input level check point



Tape Speed Adjustment

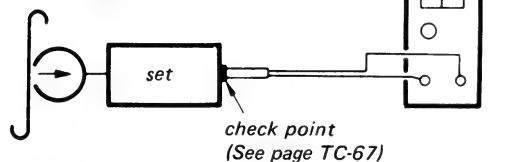
Setting:

TAPE SELECTOR switch: AUTO
DOLBY NR: OFF

Procedure:

Mode: forward playback

test tape
WS-48A
(3kHz, 0dB)



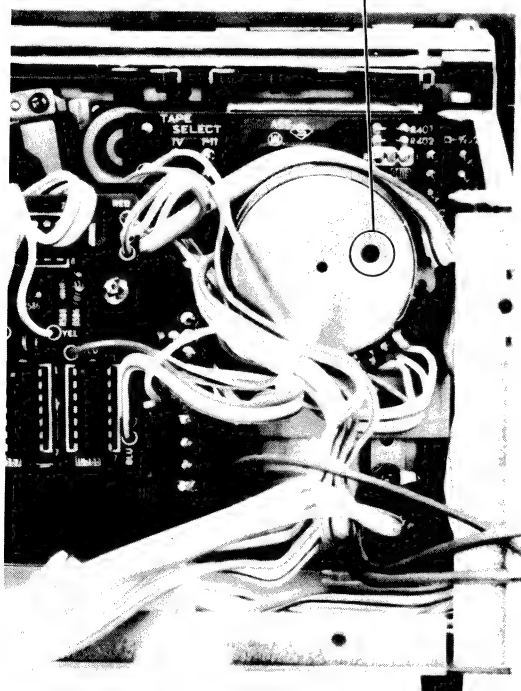
Specifications:

Speed checker	Digital frequency counter
$\pm 0.5\%$	2,985 – 3,015Hz

Frequency difference between the beginning and the end of the tape should be within 1% (30Hz).

Adjustment Location: Motor (M1)

Built-in adjustable resistor
(Adjust the speed by using screwdriver.)
(When turning the screw clockwise,
speed is faster.)

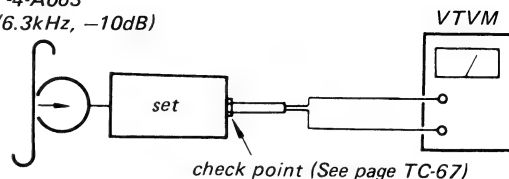


Forward Record/playback Head Azimuth Adjustment

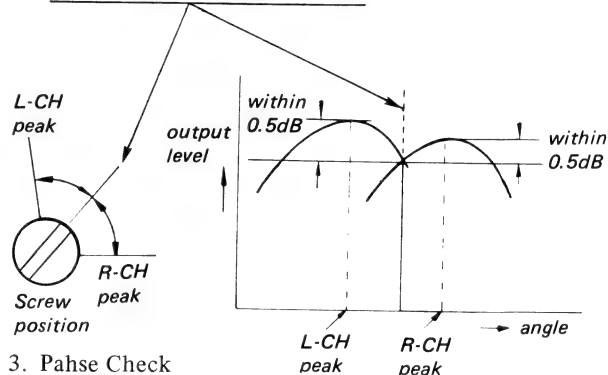
Procedure:

1. Mode: forward playback

test tape
P-4-A063
(6.3kHz, -10dB)



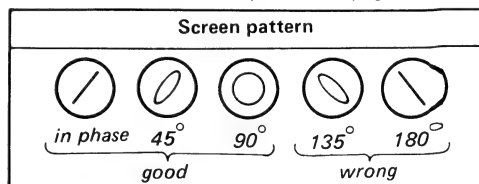
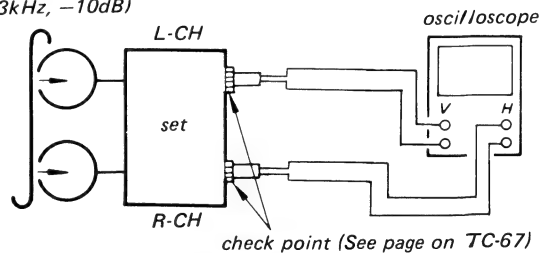
2. Turn the adjustment screw for the maximum output levels. If these levels do not match, turn the adjustment screw until both of output levels match together within 0.5dB.



3. Phase Check

Mode: forward playback

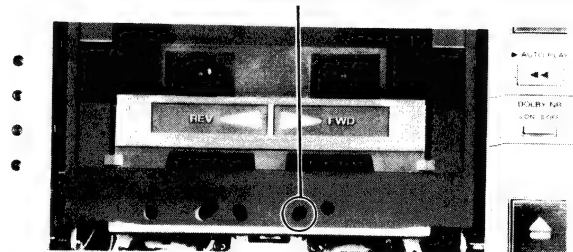
test tape
P-4-A063
(6.3kHz, -10dB)



4. After the adjustment, lock the screws with locking compound.

Adjustment Location:

adjustment screw



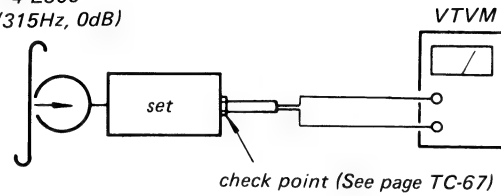
Playback Level Adjustment

Setting.

DOLBY NR switch: OFF
TAPE SELECTOR switch: AUTO

Procedure:

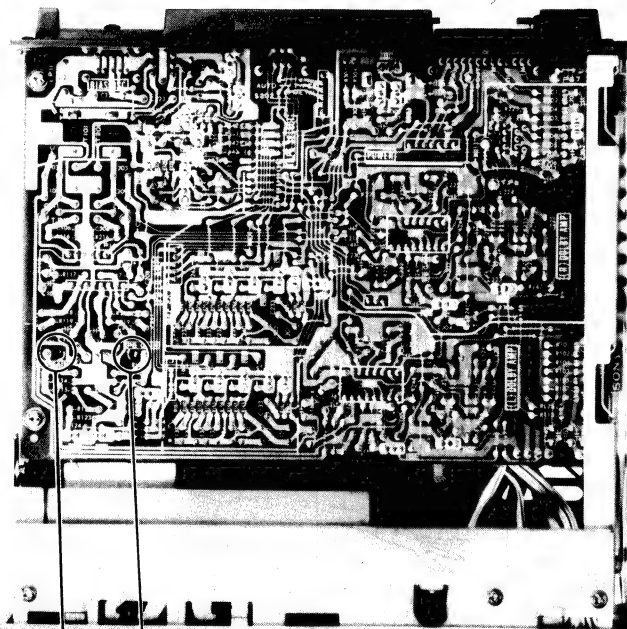
test tape
P-4-L300
(315Hz, 0dB)



Adjust RV101 (L-CH) and RV201 (R-CH) to obtain 0.29 – 0.32V (–7.5 to –8.5dB) on the VTVM.

Check that the Line out level does not change in playback mode while changing the mode from playback to stop several times.

Adjustment Location: Audio Board



RV101 RV201
(L-CH) (R-CH)

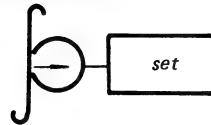
playback level adjustment

Level Meter Calibration

Proceudre:

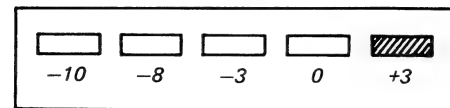
1. Mode: playback

test tape
P-4-L300
(315Hz, 0dB)

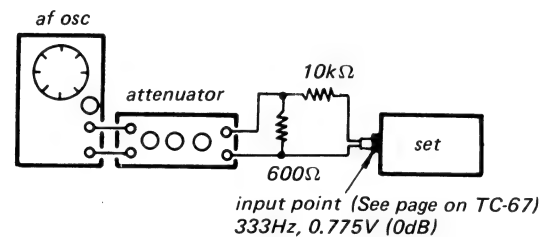


2. Adjust RV301 so that the most-rightside segment (+3dB) of the LED meter goes on and again turn it in the reverse direction until the segment just goes off.

LEVEL METER

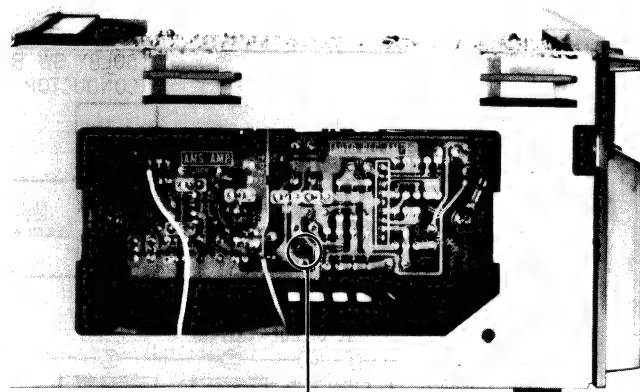


3. Mode: record



Make sure that all LEDs of level meter go on.

Adjustment Location: Audio Board



RV301

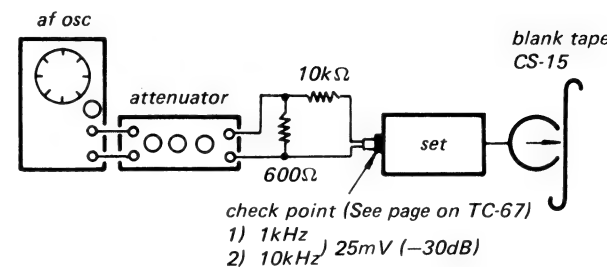
Record Bias Adjustment

Setting:

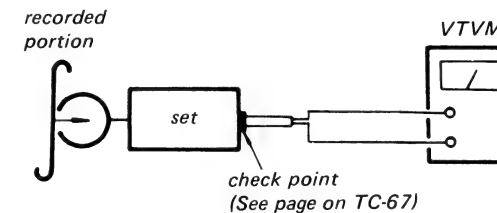
DOLBY NR switch: OFF
TAPE SELECTOR switch: AUTO
ISS switch: 1

Procedure:

1. Mode: record



2. Mode: playback

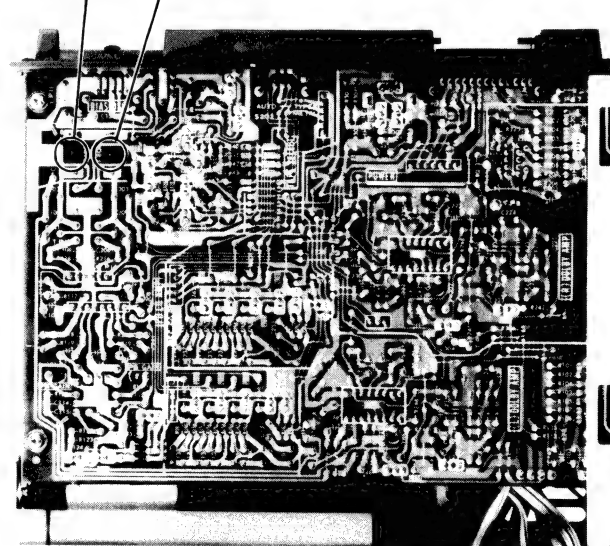


Adjust CT101 (L-CH), CT201 (R-CH) so that the measurement point level of 10kHz signal in 0dB relative to that of 1kHz.

Adjustment Location: audio board

Record Bias adjustment

CT101 CT201
(L-CH) (R-CH)



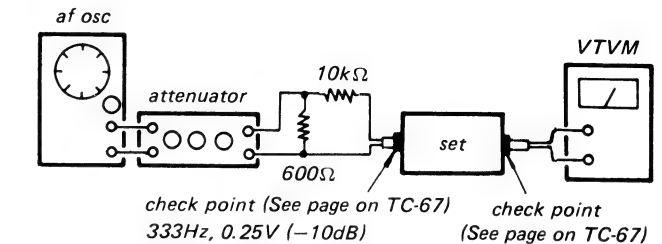
Record Level Adjustment

Setting:

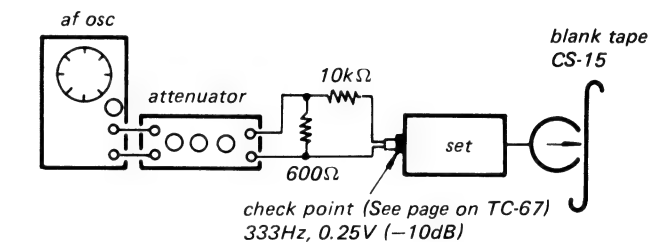
DOLBY NR switch: OFF
TAPE SELECTOR switch: AUTO
ISS switch: 1

Procedure:

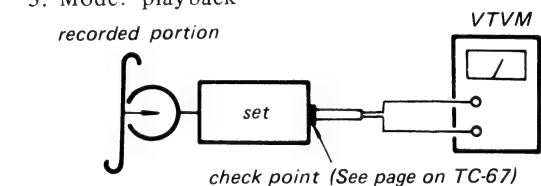
1. Mode: record



2. Mode: record

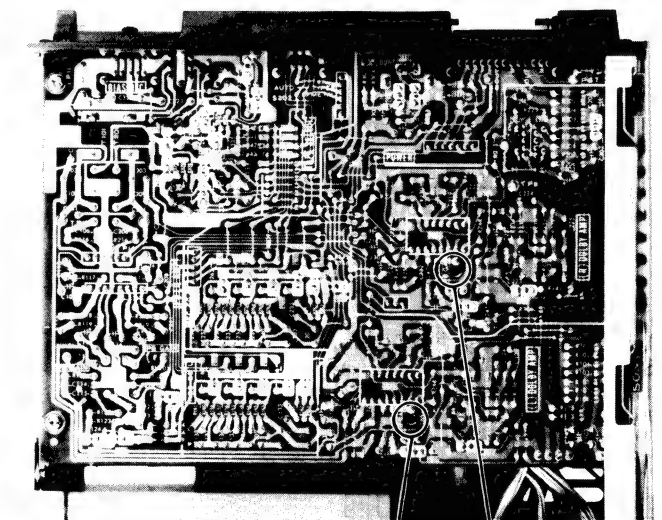


3. Mode: playback
recorded portion



4. Adjust RV102 (L-CH) and RV202 (R-CH) so that playback output level of step 3 is 0 ±0.5dB relative to that of step 1.

Adjustment Location: audio board

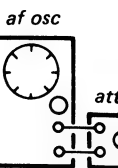


RV102 RV202
(L-CH) (R-CH)
record level adjustment

Reverse Play

Procedure:

1. Mode: record



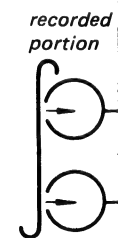
2. Mode: record



3. Turn the output level of the adjustment match together.



4. Phase Check Mode: record



5. After the compound

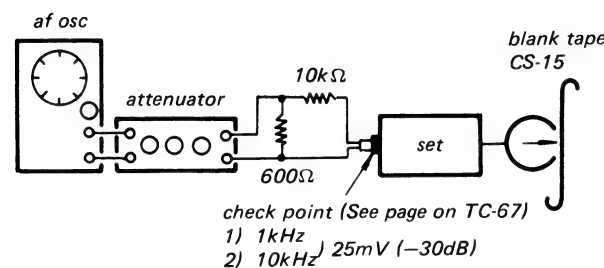
Record Bias Adjustment

Setting:

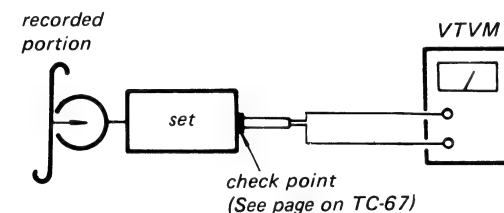
DOLBY NR switch: OFF
TAPE SELECTOR switch: AUTO
ISS switch: 1

Procedure:

1. Mode: record



2. Mode: playback

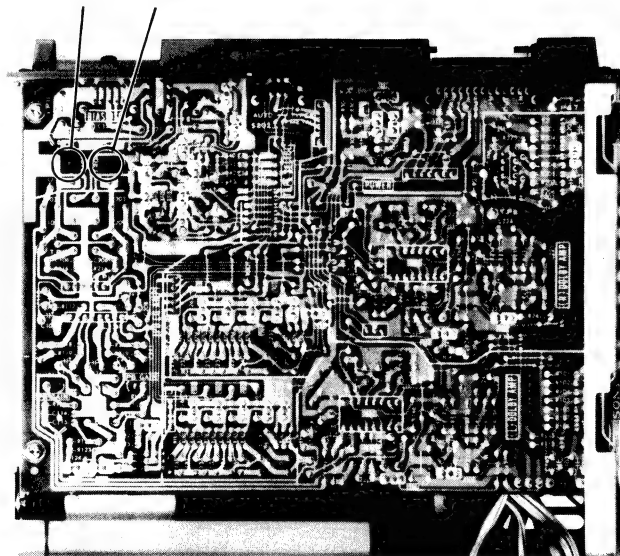


Adjust CT101 (L-CH), CT201 (R-CH) so that the measurement point level of 10kHz signal in 0dB relative to that of 1kHz.

Adjustment Location: audio board

Record Bias adjustment

CT101 (L-CH) CT201 (R-CH)



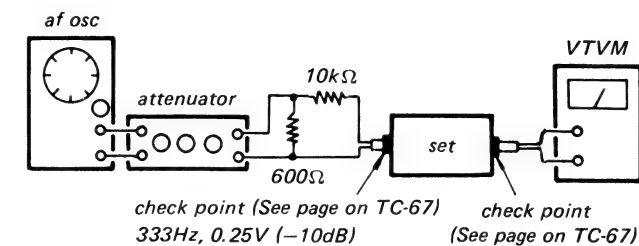
Record Level Adjustment

Setting:

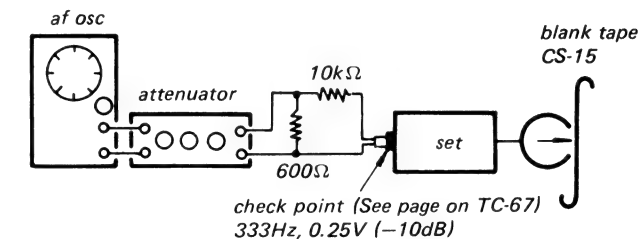
DOLBY NR switch: OFF
TAPE SELECTOR switch: AUTO
ISS switch: 1

Procedure:

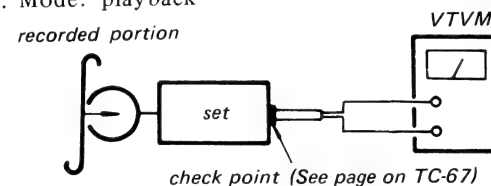
1. Mode: record



2. Mode: record

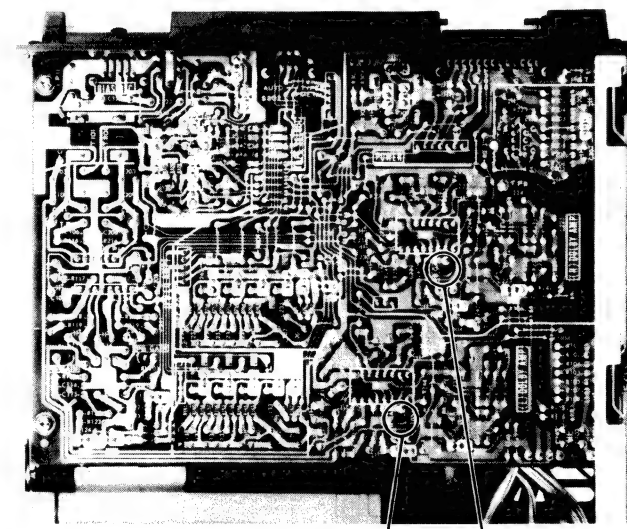


3. Mode: playback



4. Adjust RV102 (L-CH) and RV202 (R-CH) so that playback output level of step 3 is $0 \pm 0.5\text{dB}$ relative to that of step 1.

Adjustment Location: audio board

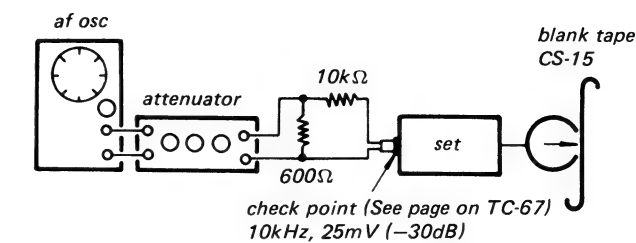


RV102 (L-CH) RV202 (R-CH)
record level adjustment

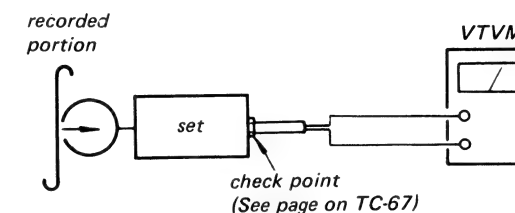
Reverse Playback Head Azimuth Adjustment

Procedure:

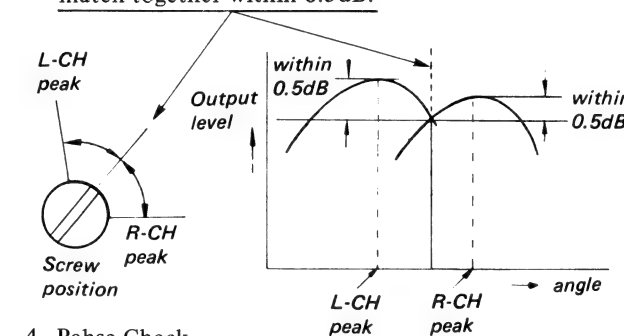
1. Mode: record



2. Mode: reverse playback

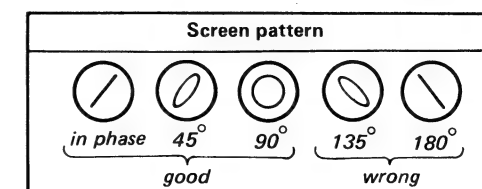
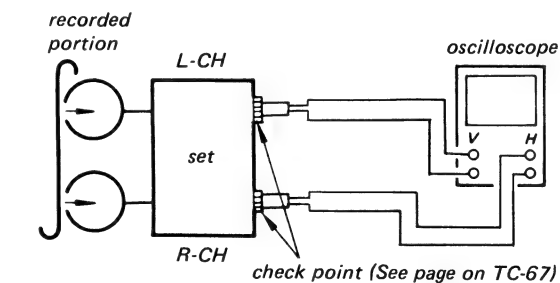


3. Turn the adjustment screw for the maximum output levels. If these levels do not match, turn the adjustment screw until both of output levels match together within 0.5dB.



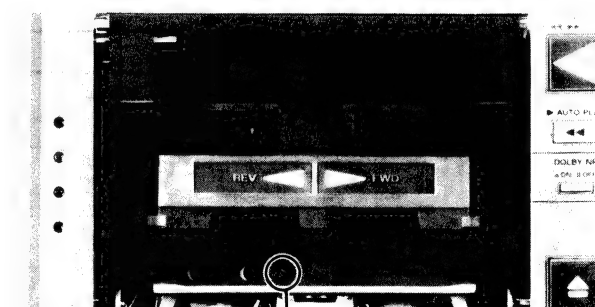
4. Phase Check

Mode: reverse playback



5. After the adjustment, lock the screws with locking compound.

Adjustment Location:

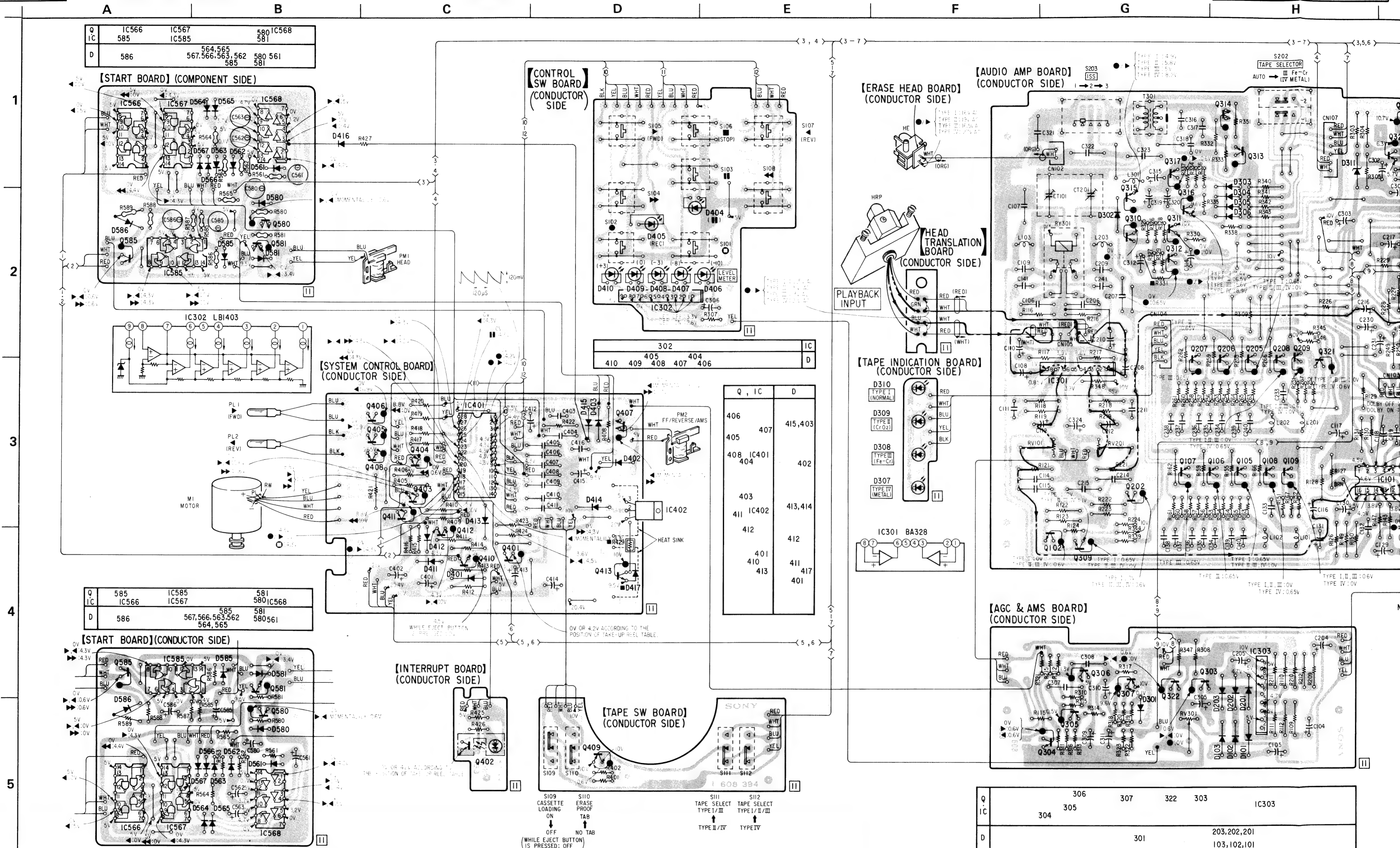


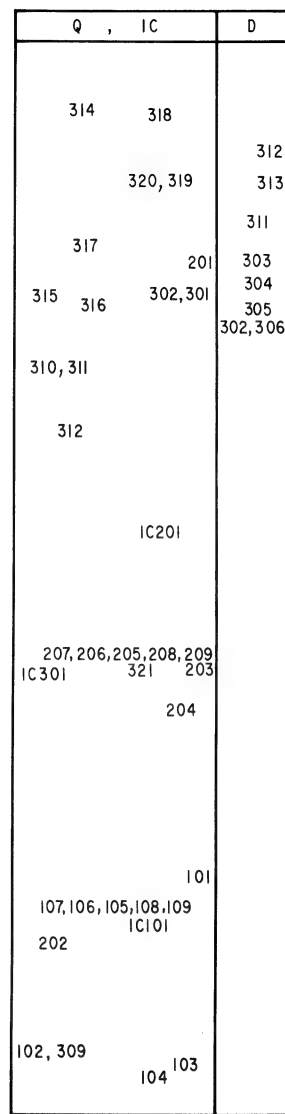
Adjustment screw

SECTION 6 DIAGRAMS

6-1. MOUNTING DIAGRAM

- See page TC-81 for Semiconductor lead layout.





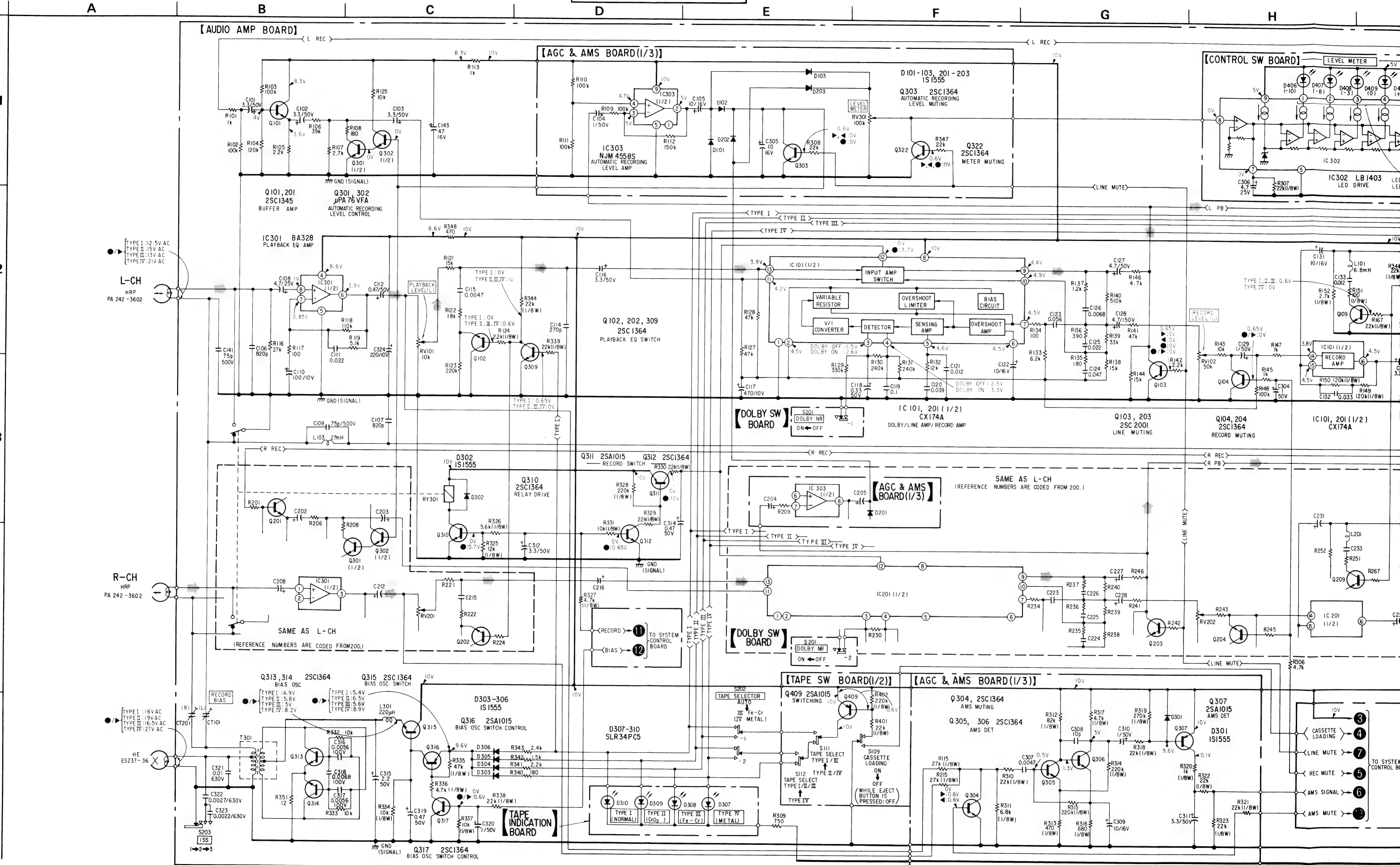
- ○ — : parts extracted from the component side.
- ● — : parts extracted from the conductor side.
- ■ : part mounted on the conductor side.
- : B + pattern
- ———→ : signal path
- ———→ : L-CH signal path
- — · · · —→ : R-CH signal path

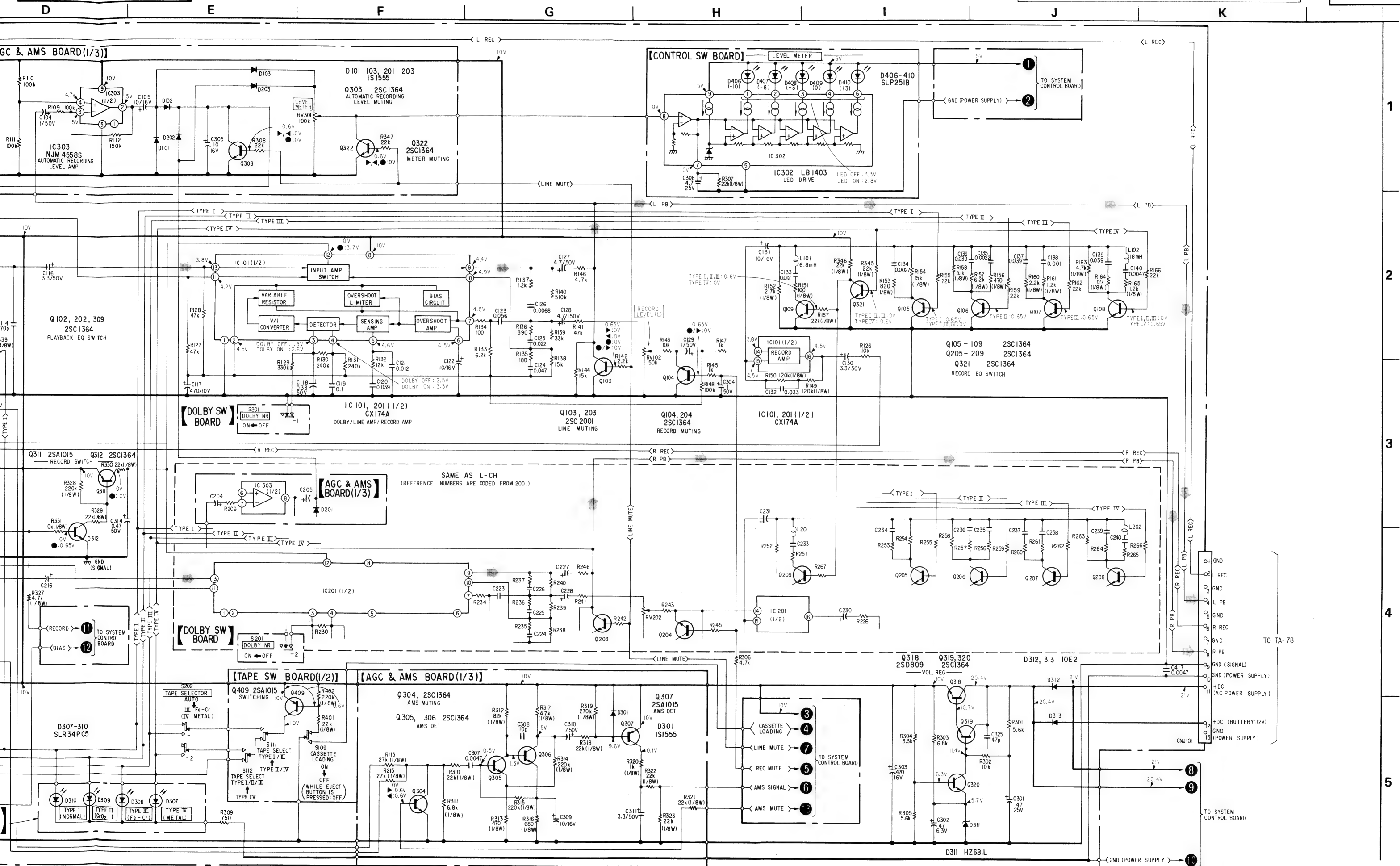
6-2. SCHEMATIC DIAGRAM - AUDIO AMP SECTION -

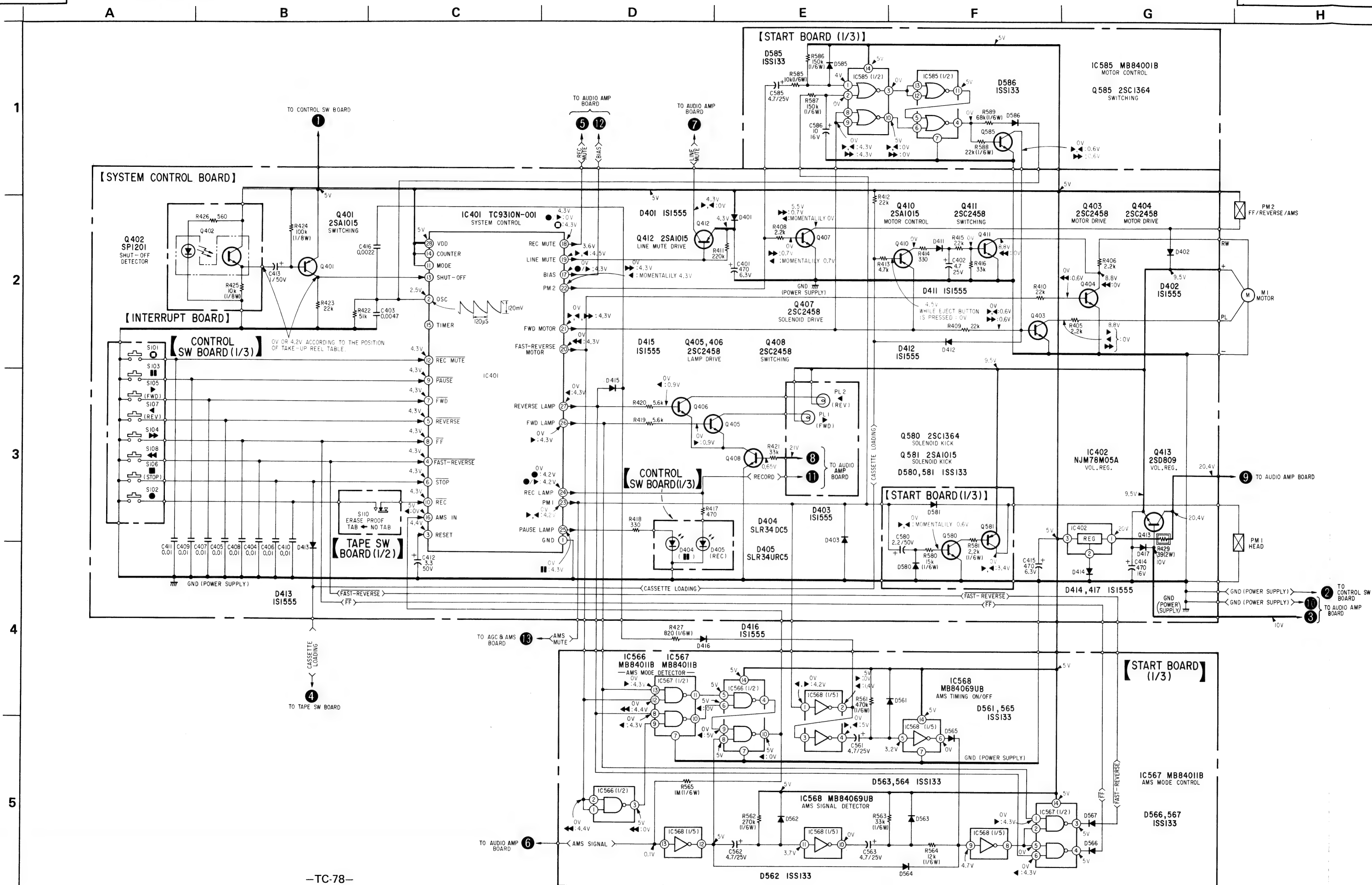
• See page TC-80 for Notes.

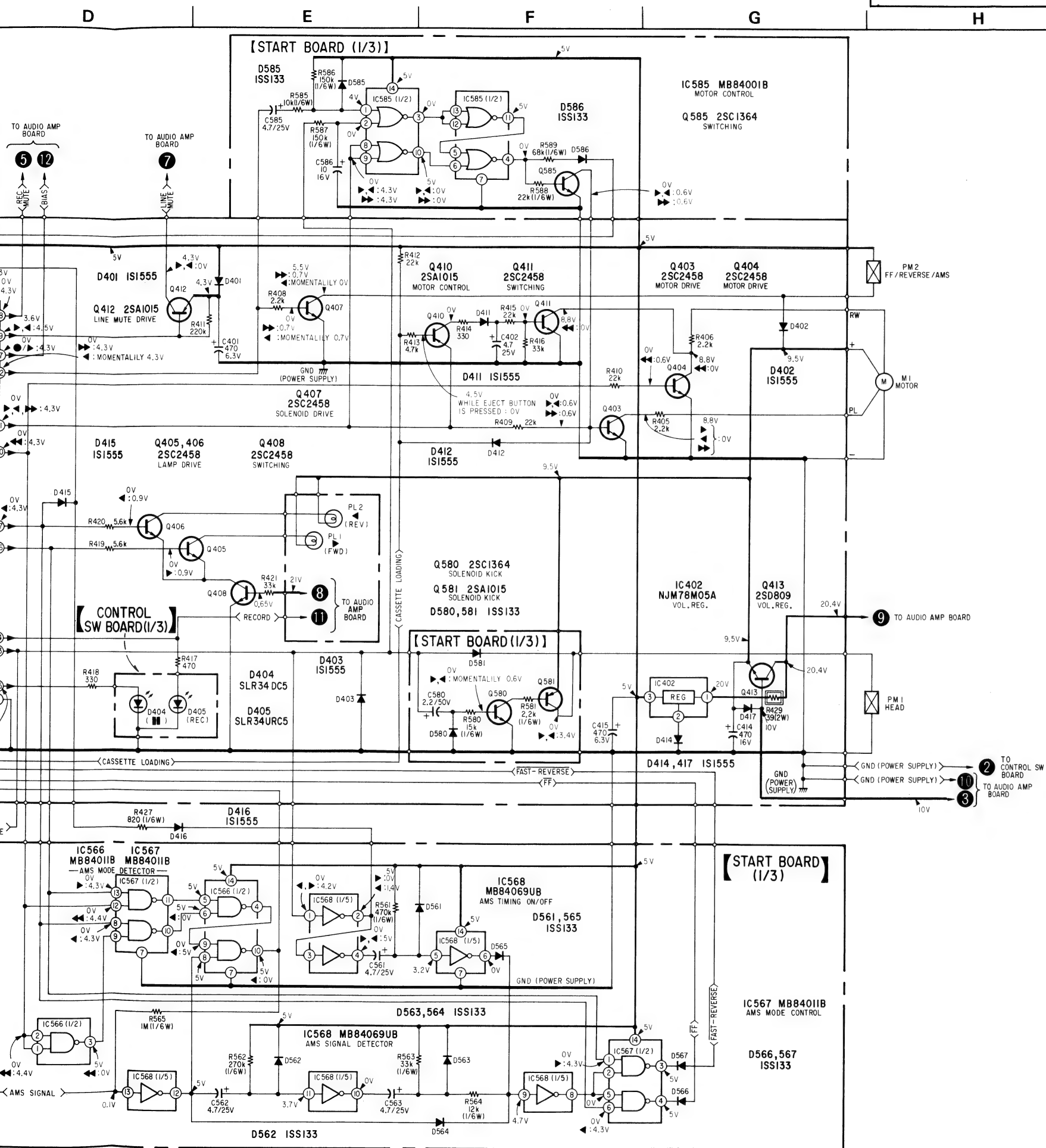
FH-7
TC-78

FH-7
TC-78









NOTE FOR SCHEMATIC DIAGRAM

— Audio Amp Section —

Note:

- Components for right channel have same values as for left channel. Reference numbers are coded from 200.
- All capacitors are in μF unless otherwise noted. $\text{pF} : \mu\text{F}$ 50WV or less are not indicated except for electrolytics and tantalums.
- All resistors are in ohms, $\frac{1}{4}\text{W}$ unless otherwise noted. $\text{k}\Omega : 1000\Omega$, $\text{M}\Omega : 1000\text{k}\Omega$
- \square : adjustment for repair.
- Readings are taken under no-signal conditions.

No mark: STOP

- ▶ : FWD
- ◀ : REV
- ▶▶ : FF
- ◀◀ : FAST-REVERSE
- : REC
- /▶ : REC/FWD
- : REC MUTE
- || : PAUSE

- ➡ : signal path

• Switch

Ref. No.	Switch	Position
S109	CASSETTE LOADING	ON
S111	TAPE SELECTOR	TYPE II/IV
S112	TAPE SELECTOR	TYPE IV
S201	DOLBY NR	OFF
S202	TAPE SELECTOR	AUTO
S203	ISS	1

— System Control Section —

Note:

- All capacitors are in μF unless otherwise noted. $\text{pF} : \mu\text{F}$ 50WV or less are not indicated except for electrolytics and tantalums.
- All resistors are in ohms, $\frac{1}{4}\text{W}$ unless otherwise noted. $\text{k}\Omega : 1000\Omega$, $\text{M}\Omega : 1000\text{k}\Omega$
- Readings are taken under no-signal conditions.

No mark: STOP


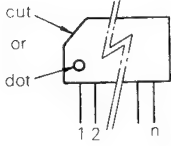
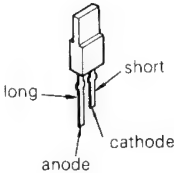

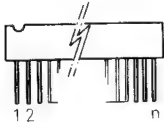
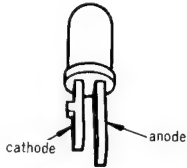
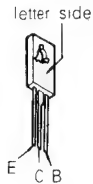
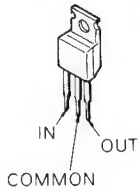
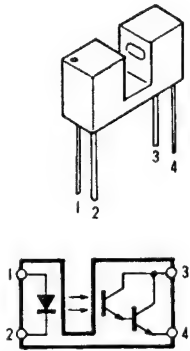
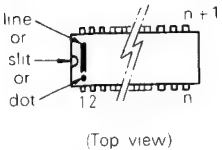
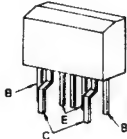
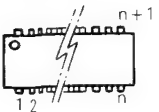
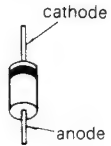
- ▶ : FWD
- ◀ : REV
- ▶▶ : FF
- ◀◀ : FAST-REVERSE
- : REC
- /▶ : REC/FWD
- : REC MUTE
- || : PAUSE

• Switch

Ref. No.	Switch	Position
S101	○ (REC MUTE)	OFF
S102	● (REC)	OFF
S103	|| (PAUSE)	OFF
S104	▶▶ (FF)	OFF
S105	▶ (FWD)	OFF
S106	■ (STOP)	OFF
S107	◀ (REV)	OFF
S108	◀◀ (FAST-REVERSE)	OFF
S110	ACCIDENTAL-ERASURE PREVENTION	NO TAB

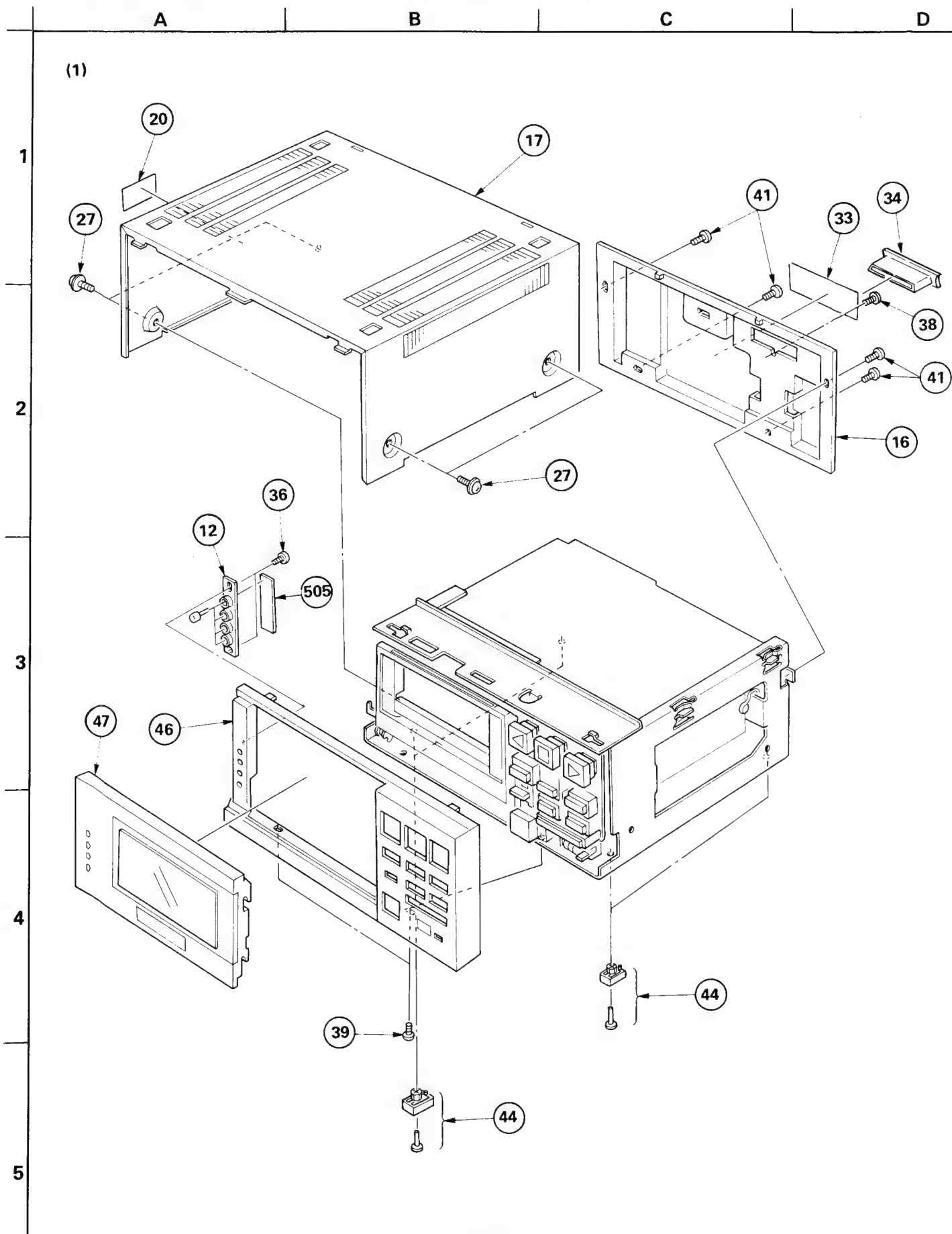
Note: Voltages are measured with a VOM (50k Ω /V).

SEMICONDUCTOR LEAD LAYOUTS

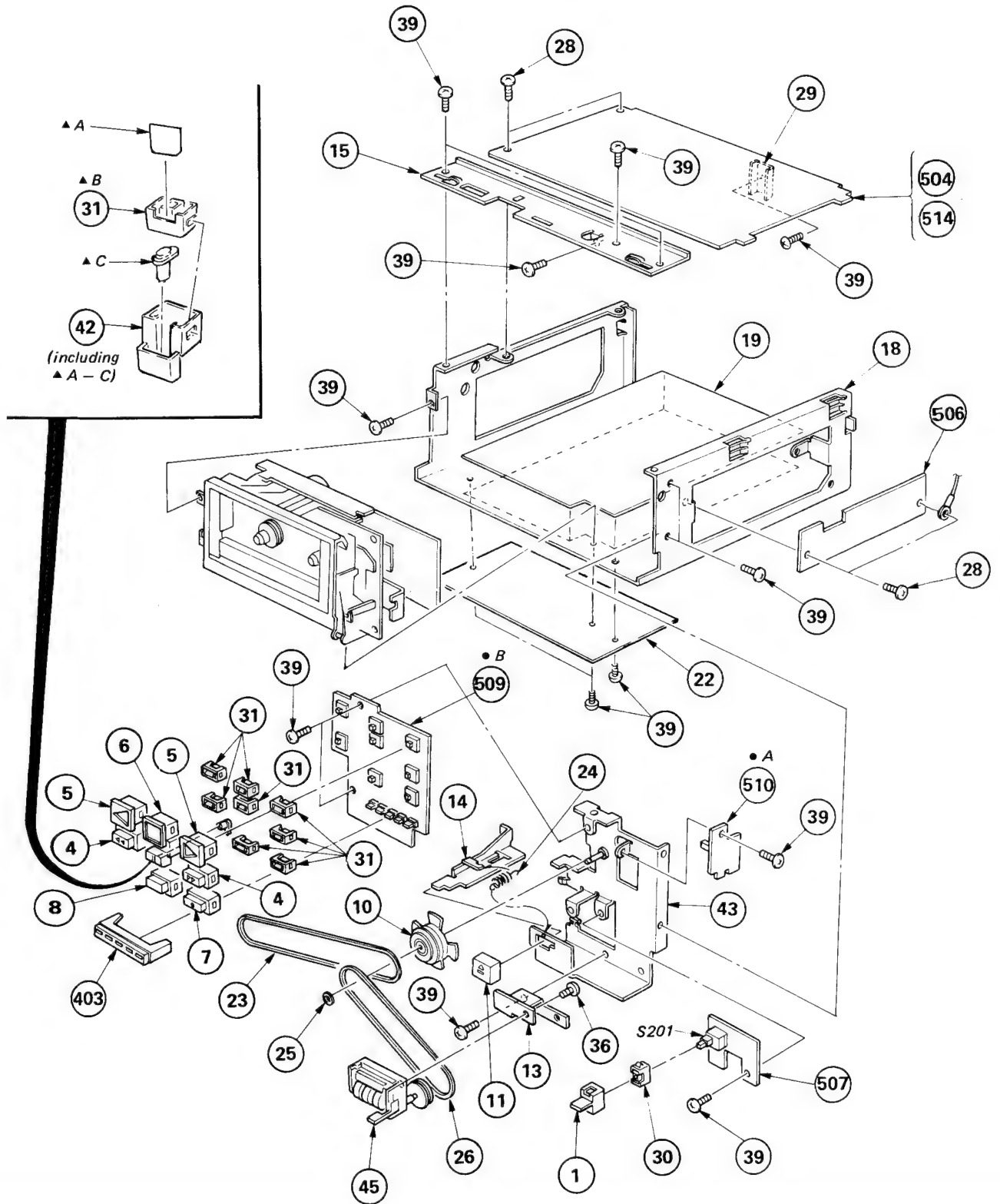
<p>2SA1015 2SC945 2SC1345 2SC1364 2SC2001</p> 	<p>LB1403 NJM4558S</p> 	<p>SLP251B</p> 
<p>2SC2458</p> 	<p>BA328</p> 	<p>SLR34DC5 SLR34PC5 SLR34URC5</p> 
<p>2SD809</p> 	<p>NJM78M05A</p> 	<p>SPI201</p> 
<p>CX174A MB84069UB TC9310N-001 μPD4011C</p>  <p>(Top view)</p>	<p>μPA76V-FA</p> 	
<p>MB84001B MB84011B</p>  <p>(Top view)</p>	<p>10E2 1S1555 1SS133 HZ6B1L</p> 	

SECTION 7 EXPLODED VIEWS AND PARTS LIST

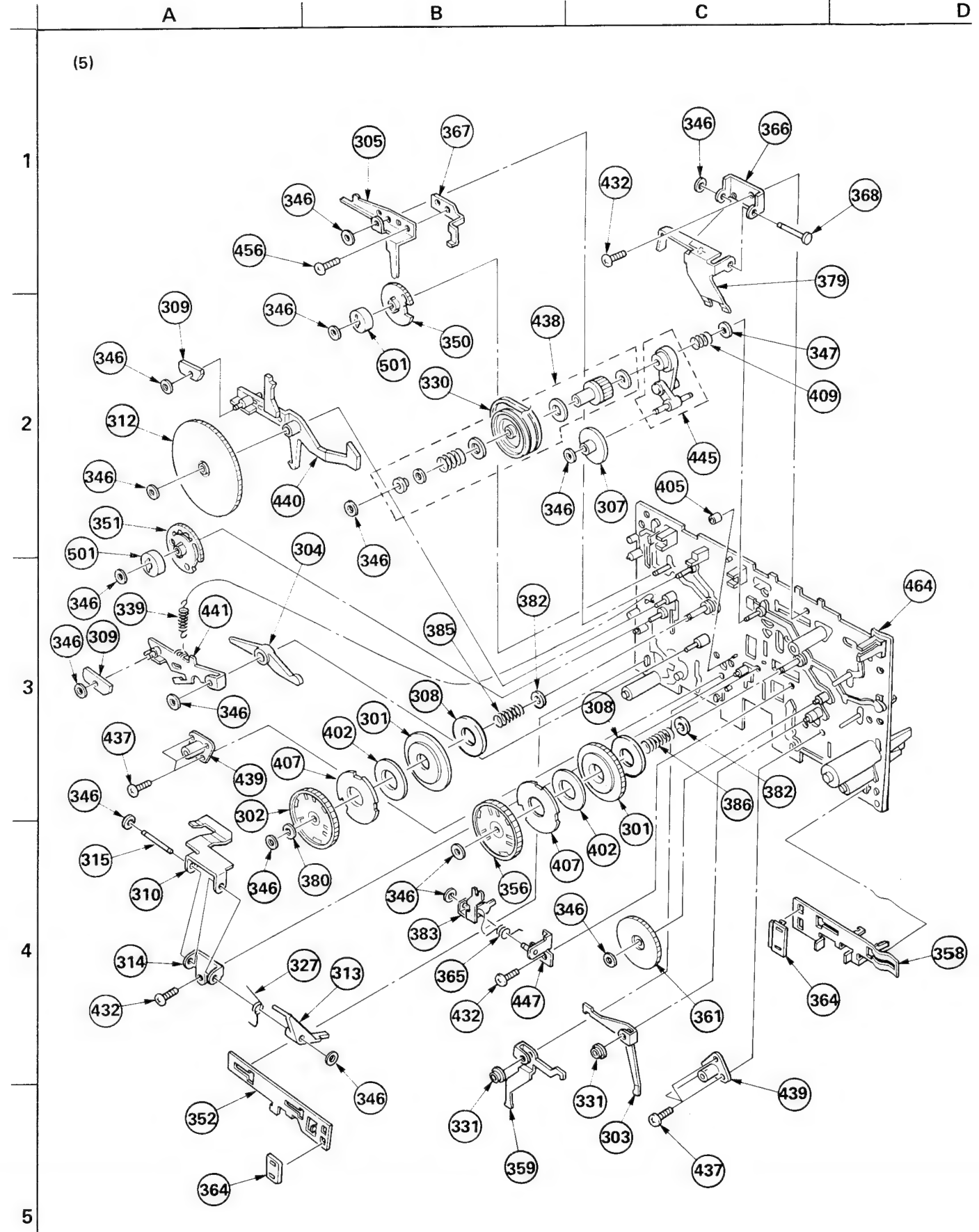
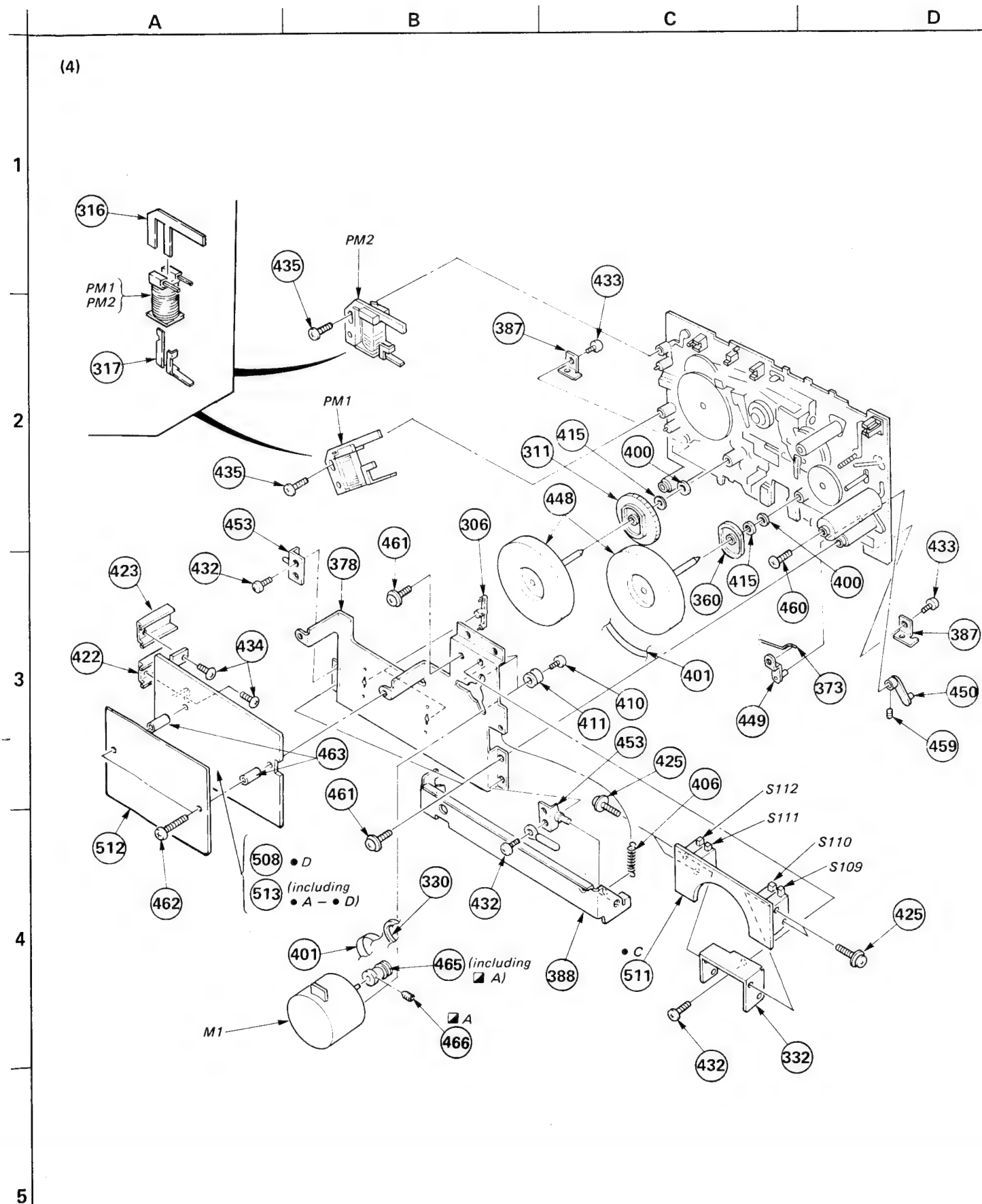
7-1. EXPLODED VIEWS



(2)







7-2. PARTS LIST

FH-7
TC-78FH-7
TC-78

GENERAL SECTION

No.	Part No.	Description
1	3-302-902-00	KNOB, PUSH
2	3-307-390-00	BUSHING, LOADING SPRING
3	3-309-101-00	PLATE (A), ORNAMENTAL, MD
4	3-309-102-00	BUTTON, REW-FF
5	3-309-106-00	BUTTON, REV-FWD
6	3-309-107-00	BUTTON, STOP
7	3-309-111-00	BUTTON, REC
8	3-309-113-00	BUTTON, REC MUTE
9	3-309-115-00	HOLDER, LAMP
10	3-309-116-00	PULLEY, MIDWAY
11	3-309-117-00	BUTTON, EJECT
12	3-309-118-00	HOLDER, TS-LED
13	▲;3-309-119-00	BRACKET, COUNTER
14	▲;3-309-120-00	SLIDER, EJECT
15	▲;3-309-128-00	JOINT
16	3-309-129-00	PLATE, JACK
17	3-309-130-00	CASE
18	▲;3-309-132-00	CHASSIS
19	▲;3-309-133-00	PLATE, SHIELD
20	3-309-134-00	LABEL, MODEL NUMBER (W)
21	.....
22	▲;3-309-137-00	PLATE, SHIELD
23	3-530-181-XX	BELT, COUNTER
24	▲;3-542-475-00	SPRING, TENSION
25	3-558-708-01	WASHER, STOPPER
26	3-533-363-00	BELT (A), COUNTER
27	3-703-354-11	SCREW (OS), CASE, CLAW
28	3-703-486-00	+PTTW 3X5
29	▲;4-861-002-11	HEAT SINK
30	4-864-307-00	RING
31	4-881-725-00	RING (TACT), FLEXIBLE
32	.....
33	4-884-865-00	(AEP,UK)...LABEL, MODEL NUMBER (AEP/UK)
33	4-884-866-00	(E).....LABEL, MODEL NUMBER (E1/E2)
34	4-884-874-00	COVER, CONNECTOR (A)
35	7-685-104-19	SCREW +P 2X6 TYPE2 NON-SLIT
36	7-685-533-19	SCREW +BTP 2.6X6 TYPE2 N-S
37	.....
38	7-685-547-19	SCREW +BTP 3X10 TYPE2 N-S
39	7-685-871-01	SCREW +BVT 3X6 (S)
40	.....
41	7-685-871-09	SCREW +BVT 3X6 (S)
42	A-2325-013-A	BUTTON ASSY, PAUSE
43	▲;X-3309-101-0	CHASSIS ASSY, AMPLIFIER
44	X-4884-801-0	FOOT ASSY, RUBBER
45	1-548-563-31	COUNTER, TAPE

GENERAL SECTION

No.	Part No.	Description
46	X-3309-103-0	PANEL ASSY, FRONT
47	X-3309-104-0	LID ASSY, CASSETTE
48	X-3309-102-0	PLATE ASSY, ORNAMENTAL, HEAD

MECHANISM SECTION

No.	Part No.	Description
301	3-307-302-00	MAGNET, REEL TABLE
302	3-307-305-02	GEAR (T), REEL
303	▲;3-307-306-00	LEVER, SELECT, REVERSE
304	3-307-307-00	LEVER, FWD
305	▲;3-307-308-00	LEVER, FF
306	3-307-309-00	RETAINER (A), THRUST
307	3-307-312-00	GEAR, FR
308	3-307-313-00	PLATE, YOKE
309	3-307-315-00	ARBOR, MOVABLE
310	3-307-319-00	RETAINER, TAKE-UP GEAR
311	3-307-320-00	GEAR (T), PINION
312	3-307-321-00	GEAR (T), DRIVING
313	3-307-328-00	LEVER, TAKE-UP SELECTION
314	▲;3-307-329-00	PLATE, FULCRUM, SELECTION LEVER
315	3-307-330-00	PIN, FULCRUM PLATE
316	3-307-332-00	ARBOR, FIXED
317	3-307-333-00	ARBOR, TRIGGER
318	▲;3-307-337-00	LEVER, REC DETECTION
319	▲;3-307-338-00	LEVER, METAL DETECTION
320	▲;3-307-339-00	SHAFT, DETECTION LEVER
321	▲;3-307-344-00	LEVER, HALF RETAINER
322	3-307-345-00	SLIDER, EJECT
323	▲;3-307-346-00	LEVER, DETECTION
324	3-307-347-00	PISTON
325	3-307-348-00	ROLLER
326	.....
327	3-307-355-00	SPRING
328	3-307-362-00	CAP, REEL
329	3-307-363-00	CLAW (N), REEL
330	3-307-366-00	BELT, FAST FORWARD

MECHANISM SECTION

No.	Part No.	Description
331	3-307-367-00	BUSHING, SELECT LEVER
332	▲;3-307-370-00	BRACKET, SWITCH
333	3-307-371-00	SPRING (LEFT)
334	3-307-372-00	SPRING (RIGHT)
335	3-307-373-00	SPRING, TENSION
336	3-307-374-00	SPRING, TENSION
337	3-307-375-00	SPRING, TENSION
338	3-307-377-00	SPRING, TENSION
339	3-307-378-00	SPRING, TENSION
340	3-307-380-00	SPRING, COMPRESSION
341	3-307-381-00	SPRING, TENSION
342	3-307-382-00	SPRING
343	3-307-383-00	SPRING
344	3-307-390-00	BUSHING, LOADING SPRING
345	3-307-391-00	SPRING
346	3-307-394-00	RETAINER (B), THRUST
347	3-307-395-00	RETAINER, SPRING
348	3-307-397-00	SLIDER, PAUSE
349	▲;3-307-399-00	SLIDER, MODE
350	3-307-401-00	GEAR, FF CAM
351	3-307-402-00	GEAR, FWD CAM
352	▲;3-307-403-00	SLIDER, FWD
353	▲;3-307-404-00	RETAINER, DETECTION SWITCH
354	▲;3-307-405-00	PLATE, FULCRUM, CASSETTE HOLDER
355	3-307-407-00	HOLDER, CASSETTE
356	3-307-412-00	GEAR, TAKE-UP REEL
357	3-307-416-00	STOPPER, LOADING
358	▲;3-307-420-00	SLIDER, REVERSE
359	▲;3-307-421-00	LEVER (R), FWD SELECTION
360	3-307-422-00	GEAR (S), PINION
361	3-307-423-00	GEAR (S), DRIVING
362	3-307-427-00	GEAR, HEAD, ROTARY
363	3-307-435-00	NUT, ADJUSTMENT, TAPE GUIDE
364	▲;3-307-437-00	BLOCK, HEAD SELECTION
365	3-307-441-00	SPRING
366	▲;3-307-443-00	BRACKET, RETAINER, SUPPLY GEAR
367	▲;3-307-444-00	LEVER, FF ASSIST
368	▲;3-307-445-00	SHAFT, RETAINER, SUPPLY GEAR
369	.....
370	3-307-447-00	CLAW (R), REEL
371	3-307-448-00	SCREW, ADJUSTMENT, AZIMUTH
372	▲;3-307-449-00	LEVER (R), PAUSE
373	▲;3-307-450-00	ROD, PULL, PAUSE
374	3-307-457-00	SPRING
375	3-307-458-00	PLATE (L), ADJUSTMENT, HEAD

MECHANISM SECTION

No.	Part No.	Description
376	3-307-460-00	SPRING, COMPRESSION
377	3-307-461-00	SPRING, TENSION
378	▲;3-307-462-00	RETAINER (R), THRUST
379	▲;3-307-464-00	RETAINER, SUPPLY GEAR
380	3-307-465-00	RETAINER, TAKE-UP
381	▲;3-307-466-00	CLAMP
382	▲;3-307-467-00	RETAINER, SPRING
383	3-307-469-00	LEVER, SELECTION, SUPPLY
384	3-307-470-00	GUIDE (L), TAPE
385	3-307-471-00	SPRING, COMPRESSION
386	3-307-471-11	SPRING, COMPRESSION
387	▲;3-307-472-00	BRACKET, MD
388	▲;3-307-474-00	LEVER (R2), EJECT
389	3-307-477-01	SEAM (A), HEAD ADJUSTMENT (t=0.1)
390	3-307-477-11	SEAM (A), HEAD ADJUSTMENT (t=0.2)
391	3-307-477-21	SEAM (A), HEAD ADJUSTMENT (t=0.3)
392	3-307-477-31	SEAM (A), HEAD ADJUSTMENT (t=0.4)
393	.....
394	3-307-479-01	SEAM (B), HEAD ADJUSTMENT (t=0.1)
395	3-307-479-11	SEAM (B), HEAD ADJUSTMENT (t=0.2)
396	3-307-479-21	SEAM (B), HEAD ADJUSTMENT (t=0.3)
397	3-307-479-31	SEAM (B), HEAD ADJUSTMENT (t=0.4)
398	3-307-480-00	SEAM, HEAD (t=0.05)
399	3-307-481-00	BASE, HEAD
400	3-307-482-00	WASHER, LUMILER
401	3-307-483-00	BELT (R), CAPSTAN
402	3-307-958-00	WASHER, POLYETHYLENE
403	3-309-105-00	HOLDER, REC-LED
404	3-527-189-00	SPRING, TENSION
405	3-538-051-00	RUBBER, BRAKE
406	3-578-393-00	SPRING, TENSION
407	3-561-827-00	PLATE (A), HYSTERESIS
408	.....
409	3-566-903-00	SPRING
410	3-570-027-00	SCREW, MOTOR
411	3-570-118-00	CUSHION, MOTOR
412	3-570-914-00	SPRING, TENSION
413	3-575-392-00	RING, PISTON
414	3-644-718-00	SPRING, COMPRESSION
415	3-701-438-11	WASHER, 2.5
416	.....
417	.....
418	.....
419	3-701-467-00	SCREW, LOCK
420	.....

NOTE:

- Items with no part number and no description are not stocked because they are seldom required for routine service.
- Items marked "▲" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- Due to standardization, parts with part numbers (▲-▲▲-▲▲-XX or ▲-▲▲-▲▲-XX) may be different from those used in the set.

CAPACITORS:

- All capacitors are in μ F. Common capacitors are omitted. Refer to the following lists for their part numbers.
- MF: μ F, PF: μ F.

RESISTORS

- All resistors are in ohms. Common 1/4W, 1/8W and 1/16W carbon resistors are omitted. Refer to the following lists for their part numbers.
- F: nonflammable

COILS

- MMH: mH, UH: μ H

SEMICONDUCTORS

- In each case, U: μ , for example: UA: μ A, UPA: μ PA, UPC: μ PC, UPD: μ PD.

NOTE:

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- Items marked "▲" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- Due to standardization, parts with part numbers (▲-▲▲-▲▲-XX or ▲-▲▲-▲▲-XX) may be different from those used in the set.

CAPACITORS:

- All capacitors are in μ F. Common capacitors are omitted. Refer to the following lists for their part numbers.
- MF: μ F, PF: μ F.

RESISTORS

- All resistors are in ohms. Common 1/4W, 1/8W and 1/16W carbon resistors are omitted. Refer to the following lists for their part numbers.
- F: nonflammable

COILS

- MMH: mH, UH: μ H

MECHANISM SECTION

No.	Part No.	Description
421	.....
422	♣;4-861-002-11	HEAT SINK
423	♣;4-866-647-00	HEAT SINK
424	.....
425	7-621-760-05	+PSW, 2.6X16
426	7-621-772-00	SCREW +B 2X3
427	.....
428	7-621-772-40	SCREW +B 2X8
429	7-624-105-04	STOP RING 2.3, TYPE -E
430	7-627-552-07	SCREW, PRECISION +P 1.7X2.5
431	7-671-111-11	STEEL, BOUL 1.5MM
432	7-685-860-01	SCREW +BVTT 2.6X4 (S)
433	7-685-870-01	SCREW +BVTT 3X5 (S)
434	7-685-871-01	SCREW +BVTT 3X6 (S)
435	7-687-204-21	TOTSU PTPWH 2X6 NON-SLIT, TYPE2
436	.....
437	7-687-701-39	SCREW, TOTSU BTT 2.6X4
438	A-2142-022-A	PULLEY ASSY, FR
439	X-3307-303-0	BEARING ASSY, CAPSTAN
440	X-3307-304-0	LEVER ASSY, FF LOCK
441	♣;X-3307-305-0	LEVER ASSY, FWD LOCK
442	X-3307-307-0	PINCH ROLLER (N) ASSY
443	♣;X-3307-310-0	PLATE (RIGHT) ASSY, SIDE
444	X-3307-311-2	PLATE ASSY (AMS), ADJUSTMENT
445	X-3307-312-0	LEVER ASSY, FR
446	X-3307-316-0	PINCH ROLLER (R) ASSY
447	♣;X-3307-317-0	PLATE ASSY, FULCRUM, LEVER
448	X-3307-318-0	FLYWHEEL (R)-1 ASSY
449	♣;X-3307-319-0	ARM (A) ASSY, PAUSE
450	♣;X-3307-320-0	ARM (B) ASSY, PAUSE
451	X-3307-321-2	HOLDER ASSY, HEAD
452	X-3307-323-0	CHASSIS (R) ASSY, HEAD
453	♣;X-3307-326-0	PLATE (R2) ASSY, FULCRUM, EJECT
454	♣;X-3307-327-0	PLATE (L2) ASSY, SIDE
455	7-621-255-20	SCREW +P2X4
456	7-621-259-15	SCREW +P2.6X3
457	7-621-259-35	SCREW +P2.6X5
458	7-621-555-30	SCREW +K2X5
459	7-621-731-08	SET SCREW 2X2.5
460	7-685-864-01	SCREW +BVTT 2.6X4
461	7-687-246-21	SCREW, TOTSU, PTPWH 3X8, TYPE2
462	7-685-876-01	SCREW +BVTT 3X16
463	♣;3-002-407-11	COLLAR
464	♣;X-3307-331-1	CHASSIS ASSY, MECHANISM
465	X-3307-329-0	PULLEY (R) ASSY, MOTOR
466	7-621-732-08	SET SCREW 2X3

ELECTRICAL PARTS

Ref.No.	Part No.	Description
501	1-452-202-00	MAGNET
502	♣;1-608-170-00	PC BOARD, HEAD TRANSLATION
503	♣;1-608-268-00	PC BOARD, ERASE HEAD
504	♣;1-608-387-00	PC BOARD, AUDIO AMP
505	♣;1-608-388-00	PC BOARD, TAPE INDICATION
506	♣;1-608-389-00	PC BOARD, AGC & AMS
507	♣;1-608-390-00	PC BOARD, DOLBY SW
508	♣;1-608-391-00	PC BOARD, SYSTEM CONTROL
509	♣;1-608-392-00	PC BOARD, CONTROL SW
510	♣;1-608-393-00	PC BOARD, INTERRUPT
511	♣;1-608-394-00	PC BOARD, TAPE SW
512	♣;1-608-732-00	PC BOARD, START
513	♣;A-2019-148-A	MOUNTED PCB, SYSTEM CONTROL
514	♣;A-2056-173-A	MOUNTED PCB, AUDIO AMP
C101	1-123-354-00	ELECT 3.3MF 20% 50V
C102	1-123-354-00	ELECT 3.3MF 20% 50V
C103	1-123-354-00	ELECT 3.3MF 20% 50V
C104	1-123-380-00	ELECT 1MF 20% 50V
C105	1-123-356-00	ELECT 10MF 20% 16V
C106	1-161-322-00	CERAMIC 820PF 10% 50V
C107	1-161-322-00	CERAMIC 820PF 10% 50V
C108	1-123-369-00	ELECT 4.7MF 20% 25V
C109	1-107-167-00	MICA 75PF 5% 500V
C110	1-123-307-00	ELECT 100MF 20% 10V
C111	1-130-624-00	FILM 0.022MF 5% 50V
C112	1-123-351-00	ELECT 0.47MF 20% 50V
C114	1-161-316-00	CERAMIC 270PF 10% 50V
C115	1-161-377-00	CERAMIC 0.0047MF 20% 50V
C116	1-123-354-00	ELECT 3.3MF 20% 50V
C117	1-123-310-00	ELECT 470MF 20% 10V
C118	1-123-286-00	ELECT 0.33MF 20% 50V
C119	1-130-632-00	FILM 0.1MF 5% 50V
C120	1-130-627-00	FILM 0.039MF 5% 50V
C121	1-130-621-00	FILM 0.012MF 5% 50V
C122	1-123-356-00	ELECT 10MF 20% 16V
C123	1-130-629-00	FILM 0.056MF 5% 50V
C124	1-130-628-00	FILM 0.047MF 5% 50V
C125	1-130-624-00	FILM 0.022MF 5% 50V
C126	1-108-575-00	MYLAR 0.0068MF 5% 50V
C127	1-123-369-00	ELECT 4.7MF 20% 50V
C128	1-123-369-00	ELECT 4.7MF 20% 50V
C129	1-123-380-00	ELECT 1MF 20% 50V
C130	1-123-354-00	ELECT 3.3MF 20% 50V
C131	1-123-356-00	ELECT 10MF 20% 16V

NOTE:

- Items with no part number and no description are not stocked because they are seldom required for routine service.
- Items marked "♣" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- Due to standardization, parts with part numbers (Δ-ΔΔΔ-ΔΔΔ-XX or Δ-ΔΔΔΔ-ΔΔΔ-X) may be different from those used in the set.

CAPACITORS:

- All capacitors are in μF. Common capacitors are omitted. Refer to the following lists for their part numbers.
- MF:μF, PF:μF.

RESISTORS

- All resistors are in ohms. Common 1/4W, 1/8W and 1/16W carbon resistors are omitted. Refer to the following lists for their part numbers.

- F : nonflammable

COILS

- MMH : mH, UH : μH

SEMICONDUCTORS

- In each case, U : μ, for example:
UA...: μA..., UPA...: μPA..., UPC...: μPC,
UPD...: μPD...

ELECTRICAL PARTS

Ref.No.	Part No.	Description			
C132	1-130-626-00	FILM	0.033MF	5%	50V
C133	1-130-621-00	FILM	0.012MF	5%	50V
C134	1-108-565-00	MYLAR	0.0027MF	5%	50V
C135	1-108-563-00	MYLAR	0.0022MF	5%	50V
C136	1-130-627-00	FILM	0.039MF	5%	50V
C137	1-130-627-00	FILM	0.039MF	5%	50V
C138	1-108-555-00	MYLAR	0.001MF	5%	50V
C139	1-130-627-00	FILM	0.039MF	5%	50V
C140	1-108-571-00	MYLAR	0.0047MF	5%	50V
C141	1-107-167-00	MICA	75PF	5%	500V
C143	1-123-319-00	ELECT	47MF	20%	16V
C201	1-123-354-00	ELECT	3.3MF	20%	50V
C202	1-123-354-00	ELECT	3.3MF	20%	50V
C203	1-123-354-00	ELECT	3.3MF	20%	50V
C204	1-123-380-00	ELECT	1MF	20%	50V
C205	1-123-356-00	ELECT	10MF	20%	16V
C206	1-161-322-00	CERAMIC	820PF	10%	50V
C207	1-161-322-00	CERAMIC	820PF	10%	50V
C208	1-123-369-00	ELECT	4.7MF	20%	25V
C209	1-107-167-00	MICA	75PF	5%	500V
C210	1-123-307-00	ELECT	100MF	20%	10V
C211	1-130-624-00	FILM	0.022MF	5%	50V
C212	1-123-351-00	ELECT	0.47MF	20%	50V
C214	1-161-316-00	CERAMIC	270PF	10%	50V
C215	1-161-377-00	CERAMIC	0.0047MF	20%	50V
C216	1-123-354-00	ELECT	3.3MF	20%	50V
C217	1-123-310-00	ELECT	470MF	20%	10V
C218	1-123-286-00	ELECT	0.33MF	20%	50V
C219	1-130-632-00	FILM	0.1MF	5%	50V
C220	1-130-627-00	FILM	0.039MF	5%	50V
C221	1-130-621-00	FILM	0.012MF	5%	50V
C222	1-123-356-00	ELECT	10MF	20%	16V
C223	1-130-629-00	FILM	0.056MF	5%	50V
C224	1-130-628-00	FILM	0.047MF	5%	50V
C225	1-130-624-00	FILM	0.022MF	5%	50V
C226	1-108-575-00	MYLAR	0.0068MF	5%	50V
C227	1-123-369-00	ELECT	4.7MF	20%	50V
C228	1-123-369-00	ELECT	4.7MF	20%	50V
C229	1-123-380-00	ELECT	1MF	20%	50V
C230	1-123-354-00	ELECT	3.3MF	20%	50V
C231	1-123-356-00	ELECT	10MF	20%	16V
C232	1-130-626-00	FILM	0.033MF	5%	50V
C233	1-130-621-00	FILM	0.012MF	5%	50V
C234	1-108-565-00	MYLAR	0.0027MF	5%	50V
C235	1-108-563-00	MYLAR	0.0022MF	5%	50V

ELECTRICAL PARTS

Ref.No.	Part No.	Description			
C236	1-130-627-00	FILM	0.039MF	5%	50V
C237	1-130-627-00	FILM	0.039MF	5%	50V
C238	1-108-555-00	MYLAR	0.001MF	5%	50V
C239	1-130-627-00	FILM	0.039MF	5%	50V
C240	1-108-571-00	MYLAR	0.0047MF	5%	50V
C241	1-107-167-00	MICA	75PF	5%	500V
C243	1-123-319-00	ELECT	47MF	20%	16V
C301	1-123-332-00	ELECT	47MF	20%	25V
C302	1-123-294-00	ELECT	47MF	20%	6.3V
C303	1-123-323-00	ELECT	470MF	20%	16V
C304	1-123-380-00	ELECT	1MF	20%	50V
C305	1-131-371-00	TANTALUM	10MF	20%	16V
C306	1-123-328-00	ELECT	4.7MF	20%	25V
C307	1-161-377-00	CERAMIC	0.0047MF	20%	50V
C308	1-161-259-00	CERAMIC	10PF	5%	50V
C309	1-123-356-00	ELECT	10MF	20%	16V
C310	1-123-380-00	ELECT	1MF	20%	50V
C311	1-123-354-00	ELECT	3.3MF	20%	50V
C312	1-123-354-00	ELECT	3.3MF	20%	50V
C314	1-123-351-00	ELECT	0.47MF	20%	50V
C315	1-124-089-00	ELECT	2.2MF	20%	50V
C316	1-130-291-00	FILM	0.0056MF	5%	100V
C317	1-130-291-00	FILM	0.0056MF	5%	100V
C318	1-130-293-00	FILM	0.0068MF	5%	100V
C319	1-123-351-00	ELECT	0.47MF	20%	50V
C320	1-123-380-00	ELECT	1MF	20%	50V
C321	1-129-714-00	FILM	0.01MF	5%	630V
C322	1-129-928-00	FILM	0.0027MF	5%	630V
C323	1-129-898-00	FILM	0.0022MF	5%	630V
C324	1-123-308-00	ELECT	220MF	20%	10V
C325	1-101-880-00	CERAMIC	47PF	5%	50V
C401	1-123-298-00	ELECT	470MF	20%	6.3V
C402	1-123-328-00	ELECT	4.7MF	20%	25V
C403	1-108-571-00	MYLAR	0.0047MF	5%	50V
C412	1-123-354-00	ELECT	3.3MF	20%	50V
C413	1-123-380-00	ELECT	1MF	20%	50V
C414	1-123-323-00	ELECT	470MF	20%	16V
C415	1-123-298-00	ELECT	470MF	20%	6.3V
C416	1-108-563-00	MYLAR	0.0022MF	5%	50V
C417	1-161-328-00	CERAMIC	4700PF	30%	50V
C561	1-123-328-00	ELECT	4.7MF	20%	25V
C562	1-123-328-00	ELECT	4.7MF	20%	25V
C563	1-123-328-00	ELECT	4.7MF	20%	25V
C580	1-123-381-00	ELECT	2.2MF	20%	50V
C585	1-123-328-00	ELECT	4.7MF	20%	25V
C586	1-123-356-00	ELECT	10MF	20%	16V

NOTE:

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- Due to standardization, parts with part numbers (Δ-ΔΔΔ-ΔΔΔ-XX or Δ-ΔΔΔΔ-ΔΔΔ-X) may be different from those used in the set.

CAPACITORS:

- All capacitors are in μF. Common capacitors are omitted. Refer to the following lists for their part numbers.
- MF:μF, PF:μF.

RESISTORS

- All resistors are in ohms. Common 1/4W, 1/8W and 1/16W carbon resistors are omitted. Refer to the following lists for their part numbers.

- F : nonflammable

COILS

- MMH : mH, UH : μH

SEMICONDUCTORS

- In each case, U : μ, for example:
UA.... : μA..., UPA.... : μPA..., UPC.... : μPC,
UPD.... : μPD...

ELECTRICAL PARTS

Ref.No.	Part No.	Description
	CNJ101 1-562-068-00	SOCKET, CONNECTOR 13P
	▲CNJ102;1-560-060-00	PIN, CONNECTOR 2P
	▲CNJ103;1-560-061-00	PIN, CONNECTOR 3P
	▲CNJ104;1-560-063-00	PIN, CONNECTOR 5P
	▲CNJ105;1-560-064-00	PIN, CONNECTOR 6P
	▲CNJ106;1-560-338-00	PIN, CONNECTOR 7P
	▲CNJ107;1-560-064-00	PIN, CONNECTOR 6P
	CT101 1-141-225-00	CAP, TUNING, TRIMAR
	CT201 1-141-225-00	CAP, TUNING, TRIMAR
	D101 8-719-815-55	DIODE 1S1555
	D102 8-719-815-55	DIODE 1S1555
	D103 8-719-815-55	DIODE 1S1555
	D201 8-719-815-55	DIODE 1S1555
	D202 8-719-815-55	DIODE 1S1555
	D203 8-719-815-55	DIODE 1S1555
	D301 8-719-815-55	DIODE 1S1555
	D302 8-719-815-55	DIODE 1S1555
	D303 8-719-815-55	DIODE 1S1555
	D304 8-719-815-55	DIODE 1S1555
	D305 8-719-815-55	DIODE 1S1555
	D306 8-719-815-55	DIODE 1S1555
	D307 8-719-902-77	DIODE SLR34PC5
	D308 8-719-902-77	DIODE SLR34PC5
	D309 8-719-902-77	DIODE SLR34PC5
	D310 8-719-902-77	DIODE SLR34PC5
	D311 8-719-910-64	DIODE HZ6B1L
	D312 8-719-200-02	DIODE 10E-2
	D313 8-719-200-02	DIODE 10E-2
	D401 8-719-815-55	DIODE 1S1555
	D402 8-719-815-55	DIODE 1S1555
	D403 8-719-815-55	DIODE 1S1555
	D404 8-719-902-78	DIODE SLR34DC5
	D405 8-719-934-05	DIODE SLR-34URC5
	D406 8-719-902-51	DIODE SLP251B
	D407 8-719-902-51	DIODE SLP251B
	D408 8-719-902-51	DIODE SLP251B
	D409 8-719-902-51	DIODE SLP251B
	D410 8-719-902-51	DIODE SLP251B
	D411 8-719-815-55	DIODE 1S1555
	D412 8-719-815-55	DIODE 1S1555
	D413 8-719-815-55	DIODE 1S1555
	D414 8-719-815-55	DIODE 1S1555
	D415 8-719-815-55	DIODE 1S1555
	D416 8-719-815-55	DIODE 1S1555
	D417 8-719-815-55	DIODE 1S1555

ELECTRICAL PARTS

Ref.No.	Part No.	Description
	D561 8-719-901-33	DIODE 1SS133
	D562 8-719-901-33	DIODE 1SS133
	D563 8-719-901-33	DIODE 1SS133
	D564 8-719-901-33	DIODE 1SS133
	D565 8-719-901-33	DIODE 1SS133
	D566 8-719-901-33	DIODE 1SS133
	D567 8-719-901-33	DIODE 1SS133
	D580 8-719-901-33	DIODE 1SS133
	D581 8-719-901-33	DIODE 1SS133
	D585 8-719-901-33	DIODE 1SS133
	D586 8-719-901-33	DIODE 1SS133
	HE 8-825-535-20	HEAD, ERASE (ES237-36)
	HRP 8-825-548-10	R/P HEAD (PA242-3602)
	IC101 8-759-300-74	IC CX-174A
	IC201 8-759-300-74	IC CX-174A
	IC301 8-759-932-80	IC BA328
	IC302 8-759-800-32	IC LB1403
	IC303 8-759-700-08	IC NJM4558S
	IC401 8-759-200-63	IC TC9310N001
	IC402 8-759-700-11	IC NJM78M05A
	IC566 8-759-984-11	IC MB84011B
	IC567 8-759-984-11	IC MB84011B
	IC568 8-759-984-69	IC MB84069UB
	IC585 8-759-985-01	IC MB84001B
	L101 1-408-255-00	MICRO INDUCTOR 6.8MMH
	L102 1-408-260-00	MICRO INDUCTOR 18MMH
	L103 1-408-262-00	MICRO INDUCTOR 27MMH
	L201 1-408-255-00	MICRO INDUCTOR 6.8MMH
	L202 1-408-260-00	MICRO INDUCTOR 18MMH
	L203 1-408-262-00	MICRO INDUCTOR 27MMH
	L301 1-408-383-00	MICRO INDUCTOR 220MH
	M1 1-541-201-00	MOTOR
	PL1 1-518-512-11	LAMP, PILOT
	PL2 1-518-512-21	LAMP, PILOT
	PM1 1-454-316-00	SOLENOID, PLUNGER, HEAD
	PM2 1-454-316-00	SOLENOID, PLUNGER, FF/REVERSE/AMS
	Q101 8-729-334-58	TRANSISTOR 2SC1345
	Q102 8-729-663-47	TRANSISTOR 2SC1364
	Q103 8-729-100-13	TRANSISTOR 2SC2001
	Q104 8-729-663-47	TRANSISTOR 2SC1364
	Q105 8-729-663-47	TRANSISTOR 2SC1364
	Q106 8-729-663-47	TRANSISTOR 2SC1364

NOTE:

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- Due to standardization, parts with part numbers (Δ-ΔΔΔ-ΔΔΔ-XX or Δ-ΔΔΔΔ-ΔΔΔ-X) may be different from those used in the set.

CAPACITORS:

- All capacitors are in μ F. Common capacitors are omitted. Refer to the following lists for their part numbers.
MF: μ F, PF: μ F.

RESISTORS

- All resistors are in ohms. Common 1/4W, 1/8W and 1/16W carbon resistors are omitted. Refer to the following lists for their part numbers.

- F : nonflammable

COILS

- MMH : mH, UH : μ H

SEMICONDUCTORS

- In each case, U : μ , for example:
UA... : μ A..., UPA... : μ PA..., UPC... : μ PC,
UPD... : μ PD...

ELECTRICAL PARTS

Ref.No.	Part No.	Description
Q107	8-729-663-47	TRANSISTOR 2SC1364
Q108	8-729-663-47	TRANSISTOR 2SC1364
Q109	8-729-663-47	TRANSISTOR 2SC1364
Q201	8-729-334-58	TRANSISTOR 2SC1345
Q202	8-729-663-47	TRANSISTOR 2SC1364
Q203	8-729-100-13	TRANSISTOR 2SC2001
Q204	8-729-663-47	TRANSISTOR 2SC1364
Q205	8-729-663-47	TRANSISTOR 2SC1364
Q206	8-729-663-47	TRANSISTOR 2SC1364
Q207	8-729-663-47	TRANSISTOR 2SC1364
Q208	8-729-663-47	TRANSISTOR 2SC1364
Q209	8-729-663-47	TRANSISTOR 2SC1364
Q301	8-759-100-22	IC UPA76V-FA
Q302	8-759-100-22	IC UPA76V-FA
Q303	8-729-663-47	TRANSISTOR 2SC1364
Q304	8-729-663-47	TRANSISTOR 2SC1364
Q305	8-729-663-47	TRANSISTOR 2SC1364
Q306	8-729-663-47	TRANSISTOR 2SC1364
Q307	8-729-201-52	TRANSISTOR 2SA1015
Q309	8-729-663-47	TRANSISTOR 2SC1364
Q310	8-729-663-47	TRANSISTOR 2SC1364
Q311	8-729-201-52	TRANSISTOR 2SA1015
Q312	8-729-663-47	TRANSISTOR 2SC1364
Q313	8-729-663-47	TRANSISTOR 2SC1364
Q314	8-729-663-47	TRANSISTOR 2SC1364
Q315	8-729-663-47	TRANSISTOR 2SC1364
Q316	8-729-201-52	TRANSISTOR 2SA1015
Q317	8-729-663-47	TRANSISTOR 2SC1364
Q318	8-729-180-93	TRANSISTOR 2SD809
Q319	8-729-663-47	TRANSISTOR 2SC1364
Q320	8-729-663-47	TRANSISTOR 2SC1364
Q321	8-729-663-47	TRANSISTOR 2SC1364
Q322	8-729-663-47	TRANSISTOR 2SC1364
Q401	8-729-201-52	TRANSISTOR 2SA1015
Q402	8-719-902-01	PHOTO INTERRUPTOR SPI201
Q403	8-729-245-83	TRANSISTOR 2SC2458
Q404	8-729-245-83	TRANSISTOR 2SC2458
Q405	8-729-245-83	TRANSISTOR 2SC2458
Q406	8-729-245-83	TRANSISTOR 2SC2458
Q407	8-729-245-83	TRANSISTOR 2SC2458
Q408	8-729-245-83	TRANSISTOR 2SC2458
Q409	8-729-201-52	TRANSISTOR 2SA1015
Q410	8-729-201-52	TRANSISTOR 2SA1015
Q411	8-729-245-83	TRANSISTOR 2SC2458
Q412	8-729-201-52	TRANSISTOR 2SA1015

ELECTRICAL PARTS

Ref.No.	Part No.	Description
Q413	8-729-180-93	TRANSISTOR 2SD809
Q580	8-729-663-47	TRANSISTOR 2SC1364
Q581	8-729-201-51	TRANSISTOR 2SA1015
Q585	8-729-663-47	TRANSISTOR 2SC1364
R101	1-246-473-00	CARBON 1K 5% 1/4W
R102	1-246-521-00	CARBON 100K 5% 1/4W
R103	1-246-521-00	CARBON 100K 5% 1/4W
R104	1-246-523-00	CARBON 120K 5% 1/4W
R105	1-246-481-00	CARBON 2.2K 5% 1/4W
R106	1-246-511-00	CARBON 39K 5% 1/4W
R107	1-246-483-00	CARBON 2.7K 5% 1/4W
R108	1-246-455-00	CARBON 180 5% 1/4W
R109	1-246-521-00	CARBON 100K 5% 1/4W
R110	1-246-521-00	CARBON 100K 5% 1/4W
R111	1-246-521-00	CARBON 100K 5% 1/4W
R112	1-246-525-00	CARBON 150K 5% 1/4W
R113	1-246-473-00	CARBON 1K 5% 1/4W
R115	1-246-800-00	CARBON 27K 5% 1/8W
R116	1-246-507-00	CARBON 27K 5% 1/4W
R117	1-246-449-00	CARBON 100 5% 1/4W
R118	1-246-522-00	CARBON 110K 5% 1/4W
R119	1-246-490-00	CARBON 5.1K 5% 1/4W
R121	1-246-501-00	CARBON 15K 5% 1/4W
R122	1-246-503-00	CARBON 18K 5% 1/4W
R123	1-246-529-00	CARBON 220K 5% 1/4W
R124	1-246-787-00	CARBON 2.2K 5% 1/8W
R125	1-246-497-00	CARBON 10K 5% 1/4W
R126	1-246-497-00	CARBON 10K 5% 1/4W
R127	1-246-513-00	CARBON 47K 5% 1/4W
R128	1-246-513-00	CARBON 47K 5% 1/4W
R129	1-246-533-00	CARBON 330K 5% 1/4W
R130	1-246-530-00	CARBON 240K 5% 1/4W
R131	1-246-530-00	CARBON 240K 5% 1/4W
R132	1-246-499-00	CARBON 12K 5% 1/4W
R133	1-246-492-00	CARBON 6.2K 5% 1/4W
R134	1-246-449-00	CARBON 100 5% 1/4W
R135	1-246-455-00	CARBON 180 5% 1/4W
R136	1-246-463-00	CARBON 390 5% 1/4W
R137	1-246-475-00	CARBON 1.2K 5% 1/4W
R138	1-246-501-00	CARBON 15K 5% 1/4W
R139	1-246-509-00	CARBON 33K 5% 1/4W
R140	1-246-538-00	CARBON 510K 5% 1/4W
R141	1-246-513-00	CARBON 47K 5% 1/4W
R142	1-246-481-00	CARBON 2.2K 5% 1/4W
R143	1-246-497-00	CARBON 10K 5% 1/4W
R144	1-246-501-00	CARBON 15K 5% 1/4W

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- Due to standardization, parts with part numbers (Δ-ΔΔΔ-ΔΔΔ-XX or Δ-ΔΔΔΔ-ΔΔΔ-X) may be different from those used in the set.

CAPACITORS:

- All capacitors are in μF. Common capacitors are omitted. Refer to the following lists for their part numbers.
- MF:μF, PF:μμF.

RESISTORS

- All resistors are in ohms. Common 1/4W, 1/8W and 1/16W carbon resistors are omitted. Refer to the following lists for their part numbers.

- F : nonflammable

COILS

- MMH : mH, UH : μH

SEMICONDUCTORS

- In each case, U : μ, for example:
 UA.... : μA..., UPA.... : μPA..., UPF.... : μPC,
 UPD.... : μPD...

ELECTRICAL PARTS

Ref.No.	Part No.	Description			
R145	1-246-473-00	CARBON	1K	5%	1/4W
R146	1-246-489-00	CARBON	4.7K	5%	1/4W
R147	1-246-473-00	CARBON	1K	5%	1/4W
R148	1-246-521-00	CARBON	100K	5%	1/4W
R149	1-246-523-00	CARBON	120K	5%	1/8W
R150	1-246-523-00	CARBON	120K	5%	1/8W
R151	1-246-771-00	CARBON	100	5%	1/8W
R152	1-246-788-00	CARBON	2.7K	5%	1/8W
R153	1-246-782-00	CARBON	820	5%	1/8W
R154	1-246-797-00	CARBON	15K	5%	1/8W
R155	1-246-505-00	CARBON	22K	5%	1/4W
R156	1-246-779-00	CARBON	470	5%	1/8W
R157	1-246-853-89	CARBON	6.2K	5%	1/8W
R158	1-246-852-00	CARBON	5.1K	5%	1/8W
R159	1-246-505-00	CARBON	22K	5%	1/4W
R160	1-246-787-00	CARBON	2.2K	5%	1/8W
R161	1-246-784-00	CARBON	1.2K	5%	1/8W
R162	1-246-505-00	CARBON	22K	5%	1/4W
R163	1-246-791-00	CARBON	4.7K	5%	1/8W
R164	1-246-796-00	CARBON	12K	5%	1/8W
R165	1-246-784-00	CARBON	1.2K	5%	1/8W
R166	1-246-505-00	CARBON	22K	5%	1/4W
R167	1-246-799-00	CARBON	22K	5%	1/8W
R201	1-246-473-00	CARBON	1K	5%	1/4W
R202	1-246-521-00	CARBON	100K	5%	1/4W
R203	1-246-521-00	CARBON	100K	5%	1/4W
R204	1-246-523-00	CARBON	120K	5%	1/4W
R205	1-246-481-00	CARBON	2.2K	5%	1/4W
R206	1-246-511-00	CARBON	39K	5%	1/4W
R207	1-246-483-00	CARBON	2.7K	5%	1/4W
R208	1-246-455-00	CARBON	180	5%	1/4W
R209	1-246-521-00	CARBON	100K	5%	1/4W
R210	1-246-521-00	CARBON	100K	5%	1/4W
R211	1-246-521-00	CARBON	100K	5%	1/4W
R212	1-246-525-00	CARBON	150K	5%	1/4W
R213	1-246-473-00	CARBON	1K	5%	1/4W
R215	1-246-800-00	CARBON	27K	5%	1/8W
R216	1-246-507-00	CARBON	27K	5%	1/4W
R217	1-246-449-00	CARBON	100	5%	1/4W
R218	1-246-522-00	CARBON	110K	5%	1/4W
R219	1-246-490-00	CARBON	5.1K	5%	1/4W
R221	1-246-501-00	CARBON	15K	5%	1/4W
R222	1-246-503-00	CARBON	18K	5%	1/4W
R223	1-246-529-00	CARBON	220K	5%	1/4W
R224	1-246-787-00	CARBON	2.2K	5%	1/8W

ELECTRICAL PARTS

Ref.No.	Part No.	Description			
R225	1-246-497-00	CARBON	10K	5%	1/4W
R226	1-246-497-00	CARBON	10K	5%	1/4W
R227	1-246-513-00	CARBON	47K	5%	1/4W
R228	1-246-513-00	CARBON	47K	5%	1/4W
R229	1-246-533-00	CARBON	330K	5%	1/4W
R230	1-246-530-00	CARBON	240K	5%	1/4W
R231	1-246-530-00	CARBON	240K	5%	1/4W
R232	1-246-499-00	CARBON	12K	5%	1/4W
R233	1-246-492-00	CARBON	6.2K	5%	1/4W
R234	1-246-449-00	CARBON	100	5%	1/4W
R235	1-246-455-00	CARBON	180	5%	1/4W
R236	1-246-463-00	CARBON	390	5%	1/4W
R237	1-246-475-00	CARBON	1.2K	5%	1/4W
R238	1-246-501-00	CARBON	15K	5%	1/4W
R239	1-246-509-00	CARBON	33K	5%	1/4W
R240	1-246-538-00	CARBON	510K	5%	1/4W
R241	1-246-513-00	CARBON	47K	5%	1/4W
R242	1-246-481-00	CARBON	2.2K	5%	1/4W
R243	1-246-497-00	CARBON	10K	5%	1/4W
R244	1-246-501-00	CARBON	15K	5%	1/4W
R245	1-246-473-00	CARBON	1K	5%	1/4W
R246	1-246-489-00	CARBON	4.7K	5%	1/4W
R247	1-246-473-00	CARBON	1K	5%	1/4W
R248	1-246-521-00	CARBON	100K	5%	1/4W
R249	1-246-523-00	CARBON	120K	5%	1/8W
R250	1-246-523-00	CARBON	120K	5%	1/8W
R251	1-246-771-00	CARBON	100	5%	1/8W
R252	1-246-788-00	CARBON	2.7K	5%	1/8W
R253	1-246-782-00	CARBON	820	5%	1/8W
R254	1-246-797-00	CARBON	15K	5%	1/8W
R255	1-246-505-00	CARBON	22K	5%	1/4W
R256	1-246-779-00	CARBON	470	5%	1/8W
R257	1-246-853-89	CARBON	6.2K	5%	1/8W
R258	1-246-852-00	CARBON	5.1K	5%	1/8W
R259	1-246-505-00	CARBON	22K	5%	1/4W
R260	1-246-787-00	CARBON	2.2K	5%	1/8W
R261	1-246-784-00	CARBON	1.2K	5%	1/8W
R262	1-246-505-00	CARBON	22K	5%	1/4W
R263	1-246-791-00	CARBON	4.7K	5%	1/8W
R264	1-246-796-00	CARBON	12K	5%	1/8W
R265	1-246-784-00	CARBON	1.2K	5%	1/8W
R266	1-246-505-00	CARBON	22K	5%	1/4W
R267	1-246-799-00	CARBON	22K	5%	1/8W
R301	1-246-491-00	CARBON	5.6K	5%	1/4W
R302	1-246-497-00	CARBON	10K	5%	1/4W

NOTE:

- Items with no part number and no description are not stocked because they are seldom required for routine service.
- Items marked "♦" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- Due to standardization, parts with part numbers (Δ-ΔΔΔ-ΔΔΔ-XX or Δ-ΔΔΔΔ-ΔΔΔ-X) may be different from those used in the set.

CAPACITORS:

- All capacitors are in μF. Common capacitors are omitted. Refer to the following lists for their part numbers.
- MF:μF, PF:μμF.

RESISTORS

- All resistors are in ohms. Common 1/4W, 1/8W and 1/16W carbon resistors are omitted. Refer to the following lists for their part numbers.

- F : nonflammable

COILS

- MMH : mH, UH : μH

SEMICONDUCTORS

In each case, U : μ, for example:

UA.... : μA..., UPA.... : μPA..., UPC.... : μPC,

UPD.... : μPD...

ELECTRICAL PARTS

Ref.No.	Part No.	Description			
R303	1-246-493-00	CARBON	6.8K	5%	1/4W
R304	1-246-485-00	CARBON	3.3K	5%	1/4W
R305	1-246-491-00	CARBON	5.6K	5%	1/4W
R306	1-246-489-00	CARBON	4.7K	5%	1/4W
R307	1-246-799-00	CARBON	22K	5%	1/8W
R308	1-246-505-00	CARBON	22K	5%	1/4W
R309	1-246-470-00	CARBON	750	5%	1/4W
R310	1-246-799-00	CARBON	22K	5%	1/8W
R311	1-246-793-00	CARBON	6.8K	5%	1/8W
R312	1-246-806-00	CARBON	82K	5%	1/8W
R313	1-246-779-00	CARBON	470	5%	1/8W
R314	1-246-811-00	CARBON	220K	5%	1/8W
R315	1-246-811-00	CARBON	220K	5%	1/8W
R316	1-246-781-00	CARBON	680	5%	1/8W
R317	1-246-791-00	CARBON	4.7K	5%	1/8W
R318	1-246-799-00	CARBON	22K	5%	1/8W
R319	1-247-046-00	CARBON	270K	5%	1/8W
R320	1-246-783-00	CARBON	1K	5%	1/8W
R321	1-246-799-00	CARBON	22K	5%	1/8W
R322	1-246-799-00	CARBON	22K	5%	1/8W
R323	1-246-799-00	CARBON	22K	5%	1/8W
R325	1-246-796-00	CARBON	12K	5%	1/8W
R326	1-246-792-00	CARBON	5.6K	5%	1/8W
R327	1-246-791-00	CARBON	4.7K	5%	1/8W
R328	1-246-811-00	CARBON	220K	5%	1/8W
R329	1-246-799-00	CARBON	22K	5%	1/8W
R330	1-246-799-00	CARBON	22K	5%	1/8W
R331	1-246-795-00	CARBON	10K	5%	1/8W
R332	1-246-497-00	CARBON	10K	5%	1/4W
R333	1-246-497-00	CARBON	10K	5%	1/4W
R334	1-246-795-00	CARBON	10K	5%	1/8W
R335	1-246-803-00	CARBON	47K	5%	1/8W
R336	1-246-791-00	CARBON	4.7K	5%	1/8W
R337	1-246-795-00	CARBON	10K	5%	1/8W
R338	1-246-799-00	CARBON	22K	5%	1/8W
R339	1-246-799-00	CARBON	22K	5%	1/8W
R340	1-246-455-00	CARBON	180	5%	1/4W
R341	1-246-481-00	CARBON	2.2K	5%	1/4W
R342	1-246-477-00	CARBON	1.5K	5%	1/4W
R343	1-246-482-00	CARBON	2.4K	5%	1/4W
R344	1-246-799-00	CARBON	22K	5%	1/8W
R345	1-246-799-00	CARBON	22K	5%	1/8W
R346	1-246-799-00	CARBON	22K	5%	1/8W
R347	1-246-505-00	CARBON	22K	5%	1/4W
R348	1-246-465-00	CARBON	470	5%	1/4W

ELECTRICAL PARTS

Ref.No.	Part No.	Description			
R351	1-246-427-00	CARBON	12	5%	1/4W
R401	1-246-799-00	CARBON	22K	5%	1/8W
R402	1-246-811-00	CARBON	220K	5%	1/8W
R405	1-246-481-00	CARBON	2.2K	5%	1/4W
R406	1-246-481-00	CARBON	2.2K	5%	1/4W
R408	1-246-481-00	CARBON	2.2K	5%	1/4W
R409	1-246-505-00	CARBON	22K	5%	1/4W
R410	1-246-505-00	CARBON	22K	5%	1/4W
R411	1-246-529-00	CARBON	220K	5%	1/4W
R412	1-246-505-00	CARBON	22K	5%	1/4W
R413	1-246-489-00	CARBON	4.7K	5%	1/4W
R414	1-246-461-00	CARBON	330	5%	1/4W
R415	1-246-799-00	CARBON	22K	5%	1/8W
R416	1-246-801-00	CARBON	33K	5%	1/8W
R417	1-246-465-00	CARBON	470	5%	1/4W
R418	1-246-461-00	CARBON	330	5%	1/4W
R419	1-246-491-00	CARBON	5.6K	5%	1/4W
R420	1-246-491-00	CARBON	5.6K	5%	1/4W
R421	1-246-509-00	CARBON	33K	5%	1/4W
R422	1-246-514-00	CARBON	51K	5%	1/4W
R423	1-246-505-00	CARBON	22K	5%	1/4W
R424	1-246-521-00	CARBON	100K	5%	1/4W
R425	1-246-795-00	CARBON	10K	5%	1/8W
R426	1-246-780-00	CARBON	560	5%	1/8W
R427	1-247-829-00	CARBON	820	5%	1/6W
R429	1-206-477-00	METAL	39	5%	2W
R561	1-247-895-00	CARBON	470K	5%	1/6W
R562	1-247-889-00	CARBON	270K	5%	1/6W
R563	1-247-867-00	CARBON	33K	5%	1/6W
R564	1-247-857-00	CARBON	12K	5%	1/6W
R565	1-247-903-00	CARBON	1M	5%	1/6W
R580	1-247-859-00	CARBON	15K	5%	1/6W
R581	1-247-839-00	CARBON	2.2K	5%	1/6W
R585	1-247-855-00	CARBON	10K	5%	1/6W
R586	1-247-883-00	CARBON	150K	5%	1/6W
R587	1-247-883-00	CARBON	150K	5%	1/6W
R588	1-247-863-00	CARBON	22K	5%	1/6W
R589	1-247-875-00	CARBON	68K	5%	1/6W
RV101	1-226-236-00	RES, ADJ, CARBON 10K			
RV102	1-226-238-00	RES, ADJ, CARBON 50K			
RV201	1-226-236-00	RES, ADJ, CARBON 10K			

NOTE:

- Items with no part number and no description are not stocked because they are seldom required for routine service.
- Items marked "●" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- Due to standardization, parts with part numbers (Δ-ΔΔΔ-ΔΔΔ-XX or Δ-ΔΔΔΔ-ΔΔΔ-X) may be different from those used in the set.

CAPACITORS:

- All capacitors are in μF. Common capacitors are omitted. Refer to the following lists for their part numbers.
- MF:μF, PF:μμF.

RESISTORS

- All resistors are in ohms. Common 1/4W, 1/8W and 1/16W carbon resistors are omitted. Refer to the following lists for their part numbers.

- F : nonflammable

COILS

- MMH : mH, UH : μH

SEMICONDUCTORS

- In each case, U : μ, for example:
UA...: μA..., UPA...: μPA..., UPC...: μPC,
UPD...: μPD...

ELECTRICAL PARTS

<u>Ref.No.</u>	<u>Part No.</u>	<u>Description</u>
RV202	1-226-238-00	RES, ADJ, CARBON 50K
RV301	1-226-239-00	RES, ADJ, CARBON 100K
RY301	1-515-473-00	RELAY
S101	1-552-412-00	SWITCH, KEY BOARD, REC MUTE
S102	1-552-412-00	SWITCH, KEY BOARD, REC
S103	1-552-412-00	SWITCH, KEY BOARD, PAUSE
S104	1-552-412-00	SWITCH, KEY BOARD, FF
S105	1-552-412-00	SWITCH, KEY BOARD, FWD
S106	1-552-412-00	SWITCH, KEY BOARD, STOP
S107	1-552-412-00	SWITCH, KEY BOARD, REV
S108	1-552-412-00	SWITCH, KEY BOARD, FAST REV
S109	1-554-205-00	SWITCH, SLIDE, CASSETTE LOADING
S110	1-554-205-00	SWITCH, SLIDE, ERASE PROOF
S111	1-554-205-00	SWITCH, SLIDE, TAPE SELECT
S112	1-554-205-00	SWITCH, SLIDE, TAPE SELECT
S201	1-554-118-00	SWITCH, PUSH, DOLBY NR
S202	1-552-334-00	SWITCH, BAND CHANGER, TAPE SELECTOR
S203	1-554-277-00	SWITCH, SLIDE, ISS
T301	1-433-259-00	TRANSFORMER, BIAS OSCILLATOR

NOTE:

- Items with no part number and no description are not stocked because they are seldom required for routine service.
- Items marked "▲" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- Due to standardization, parts with part numbers (Δ-ΔΔΔ-ΔΔΔ-XX or Δ-ΔΔΔΔ-ΔΔΔ-X) may be different from those used in the set.

CAPACITORS:

- All capacitors are in μF . Common capacitors are omitted. Refer to the following lists for their part numbers.
MF: μF , PF: $\mu\mu\text{F}$.

RESISTORS

- All resistors are in ohms. Common 1/4W, 1/8W and 1/16W carbon resistors are omitted. Refer to the following lists for their part numbers.

- F : nonflammable

COILS

- MMH : mH, UH : μH

SEMICONDUCTORS

- In each case, U : μ , for example:
UA...: μA ..., UPA...: μPA ..., UPC...: μPC ,
UPD...: μPD ...

POWER SUPPLY UNIT [AC-78]



Note: AC-78 is a power supply unit in FH-7.

CIRCUIT DESCRIPTION

Shift Circuit

In the case of a conventional amp, high voltage is required to obtain large output, and even during small output, high voltage continues to be supplied.

The heat produced from the amplifier is proportional to the voltage applied.

However, all the unneeded voltage changes into heat. It is disadvantageous for a low-output amplifier such as this unit.

The shift circuit on this model is employed to limit the high voltage supplied during small output to the minimum necessary, and control heat.

Shift Circuit Operation

The output signals from both channels of the TA-78 power amplifier enter D101 – 104, and are separated into plus and minus output by this circuit.

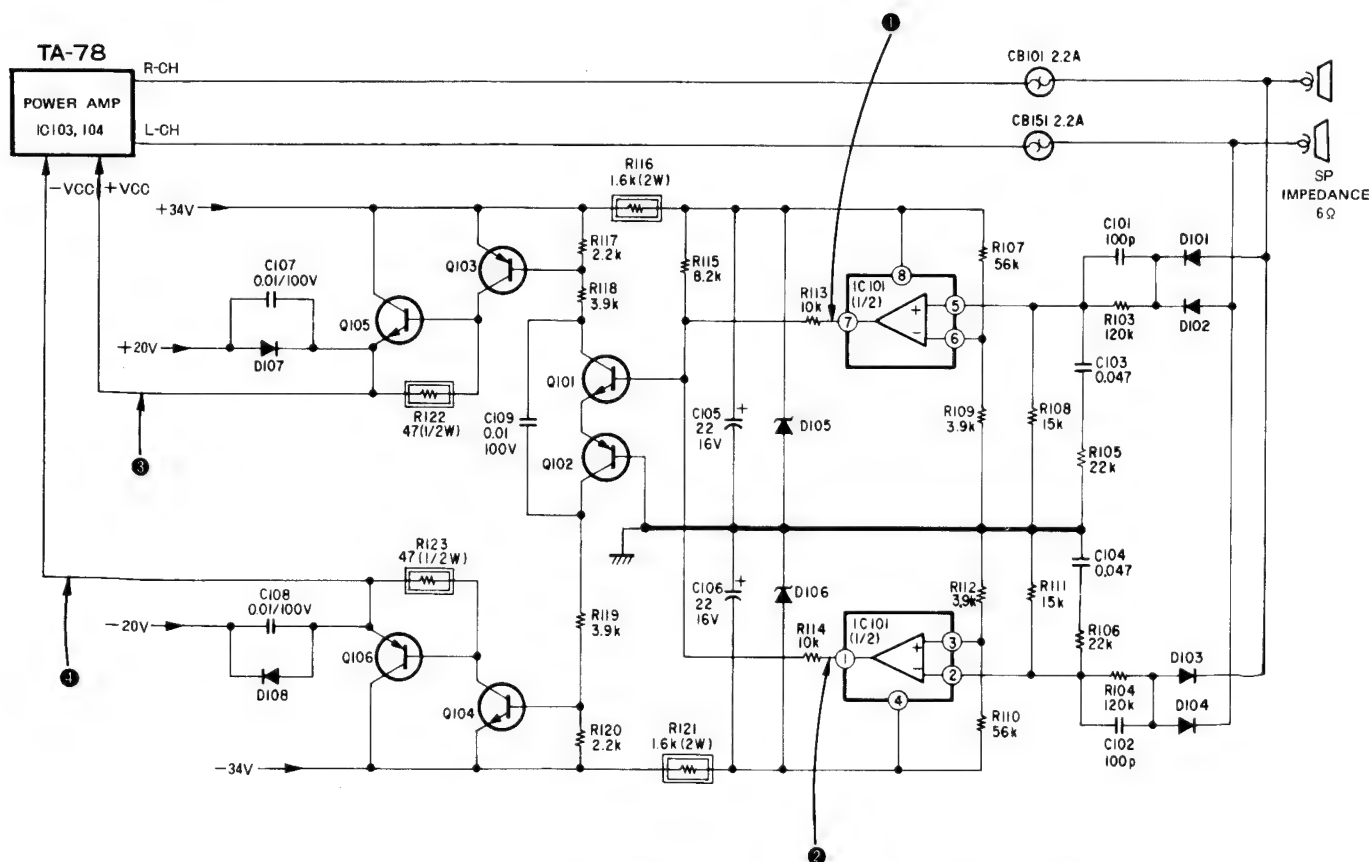
The detected output signal enters IC101, where it is compared with the level set at IC101 and the TA-78 output signal detected from D101 – 104.

During small output (approx. 5W), IC101 output goes low. At this time shift drive (Q101 – 104) all go off, and no bias is applied to Q105, Q106, which also go off, so +Vcc (+19V) and –Vcc (–19V) pass through D107, D108 respectively and are supplied to the power amplifier.

During large output (approx. 28W), IC101 output goes high. At this time shift drive (Q101 – 104) all go on, as do Q105, Q106.

±Vcc passes through Q105, Q106, becomes +Vcc (approx. +24.5V) and –Vcc (approx. –24V), and is supplied to the power amplifier. +Vcc (+19V) and –Vcc (–19V) are cut by D107, D108 being reverse biased.

Shift Circuit

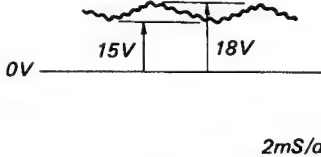
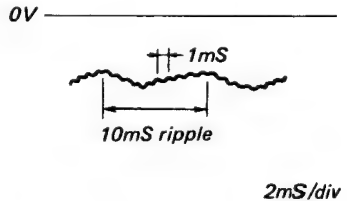
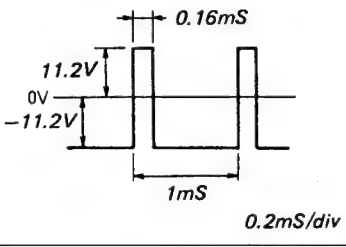
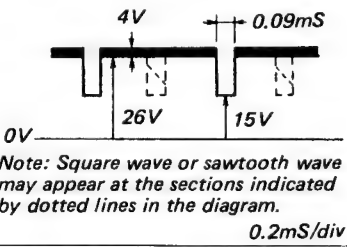
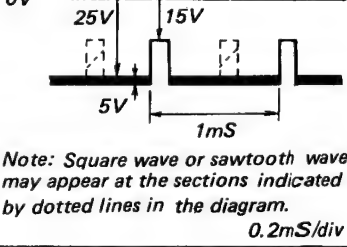
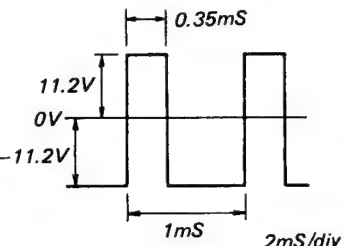
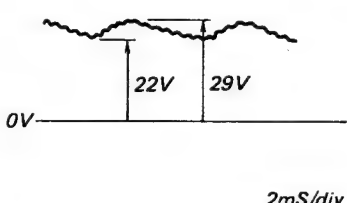
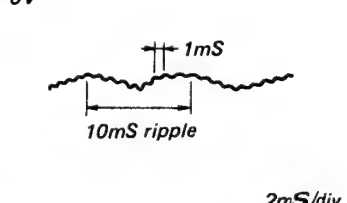


Note: Waveforms and Voltage Values of check points ① – ④ .

Notes on Repair

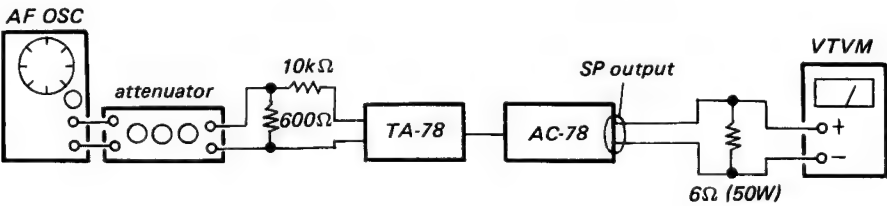
On this model's shift circuit, $\pm V_{cc}$ voltage changes according to the increase and decrease of the TA-78 output signal.

This indicates that the shift circuit is operating properly. To check shift circuit operation, refer to the chart below.

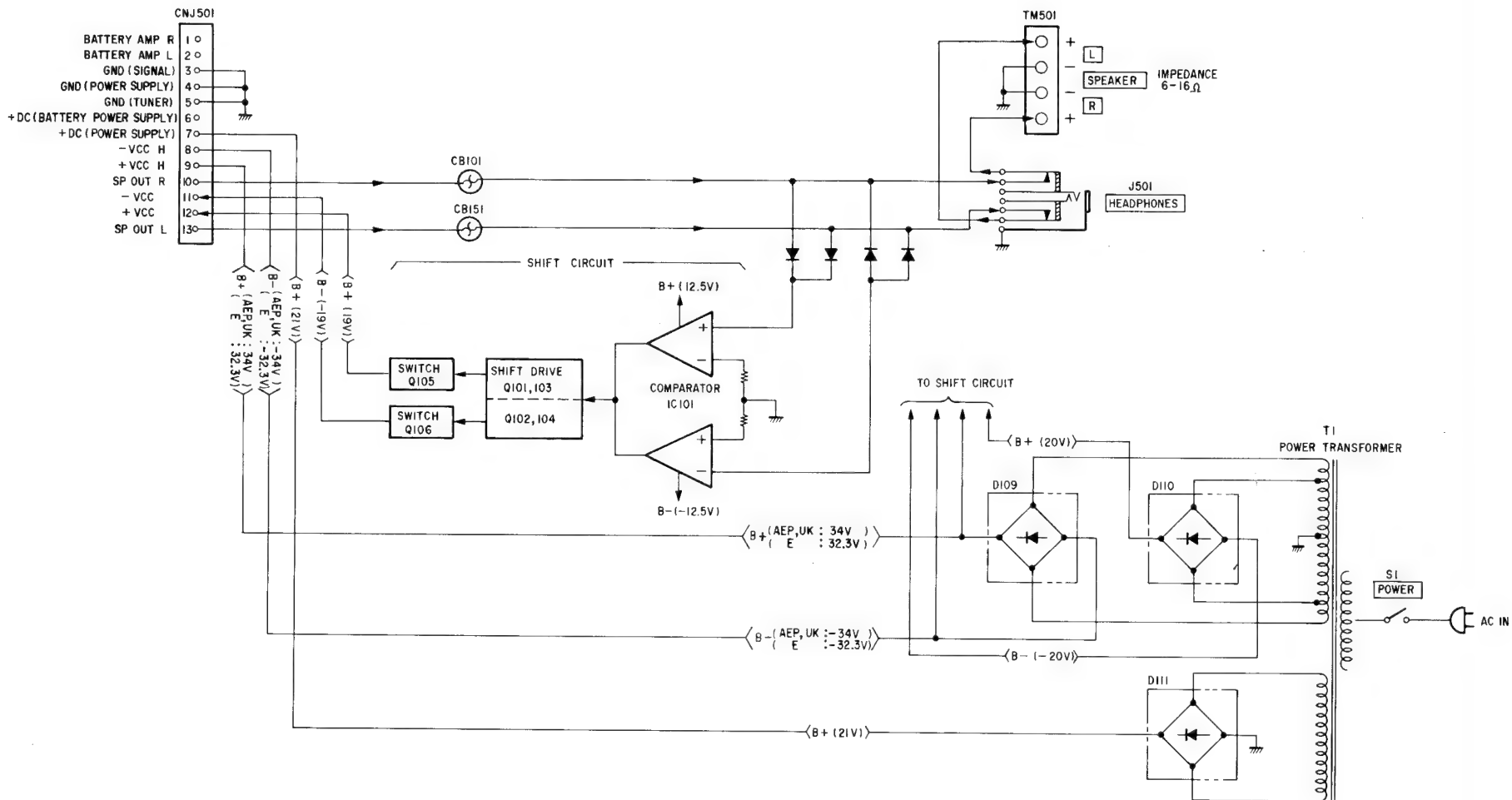
Waveforms and Voltage Values of shift circuit operation check points ① — ④ .			
SP Output Voltage (VTVM)	① , ②	③	④
0V with no signal output	(-11.5V)	(+19V)	(-19V)
5.5V with low output	(-11.5V)	(+16.5V) 	(-16.5V) 
8V with normal output	(-7.4V) 	(+26.5V)  <i>Note: Square wave or sawtooth wave may appear at the sections indicated by dotted lines in the diagram.</i>	(-26.5V)  <i>Note: Square wave or sawtooth wave may appear at the sections indicated by dotted lines in the diagram.</i>
13V with high output	(-3.2V) 	(+24.5V) 	(-24.5V) 

() : VOM voltage values

AF OSC 1kHz (sinewave)
SP impedance : 6Ω/with both channels driven

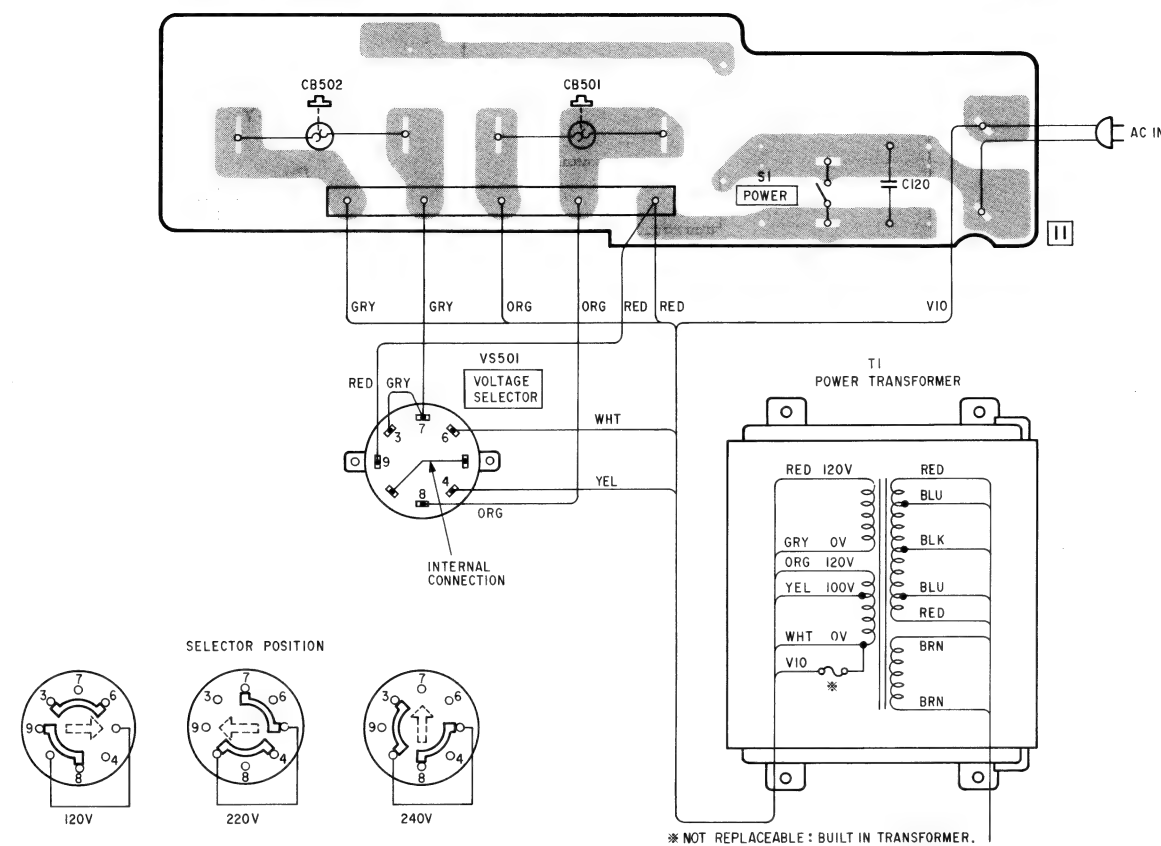


SECTION 1
BLOCK DIAGRAM



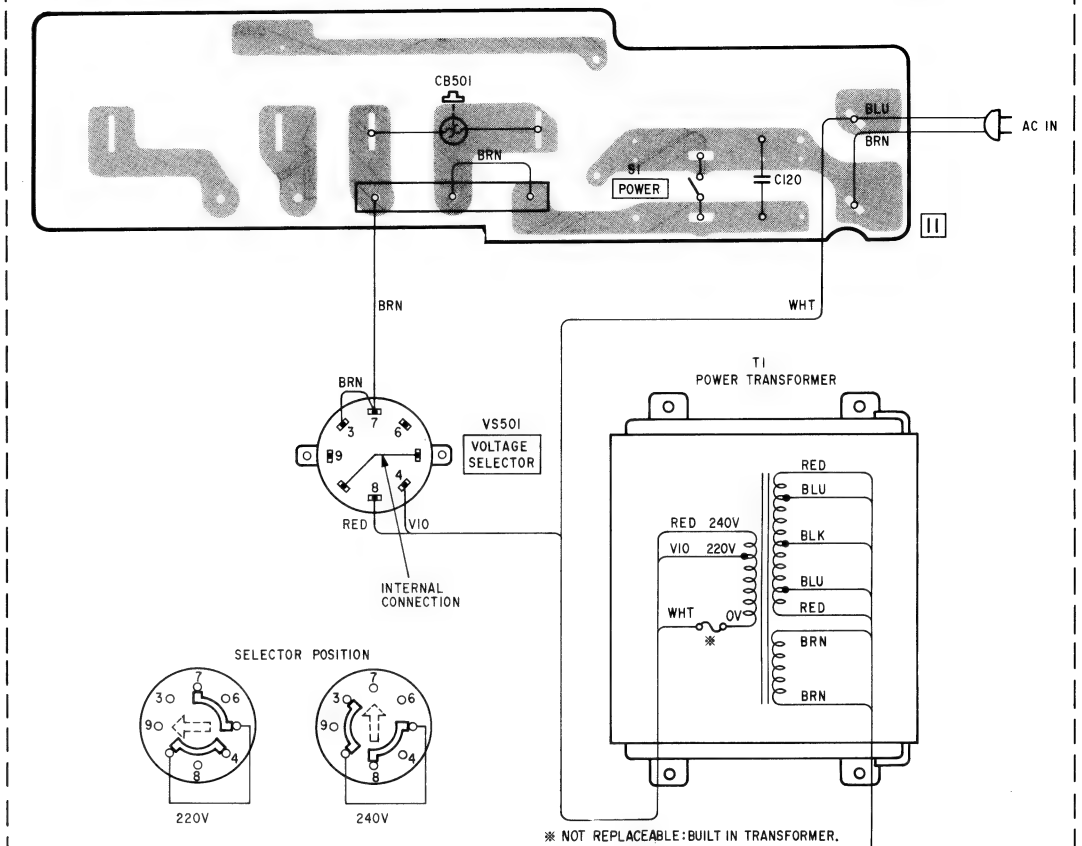
【POWER SW BOARD】

E MODEL

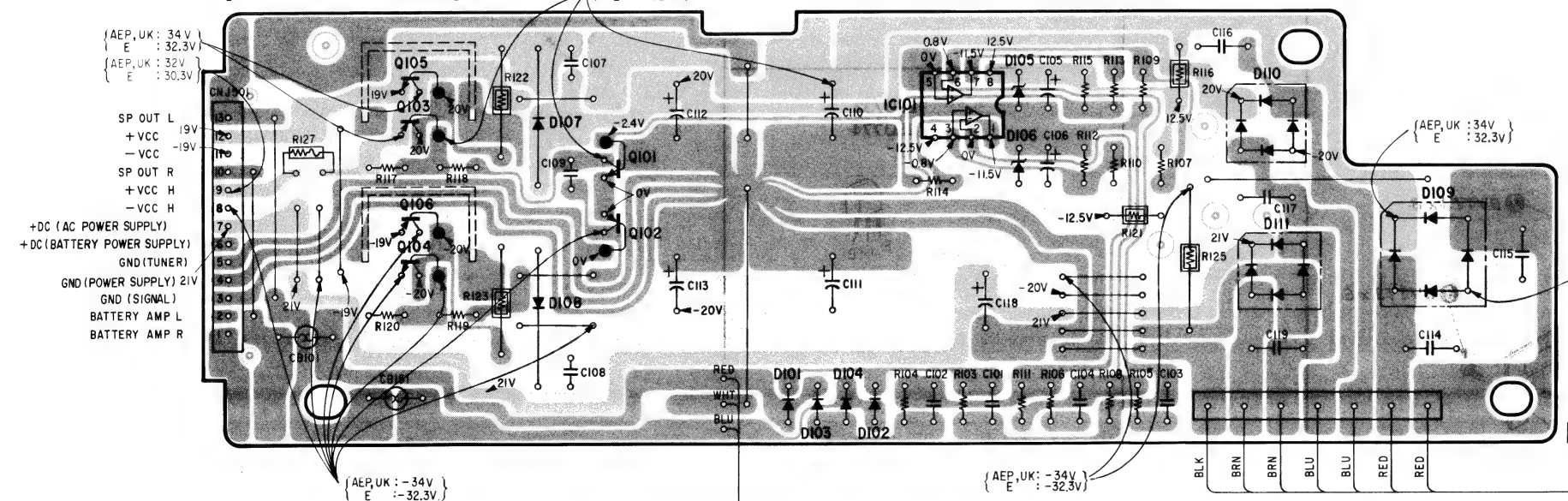


【POWER SW BOARD】

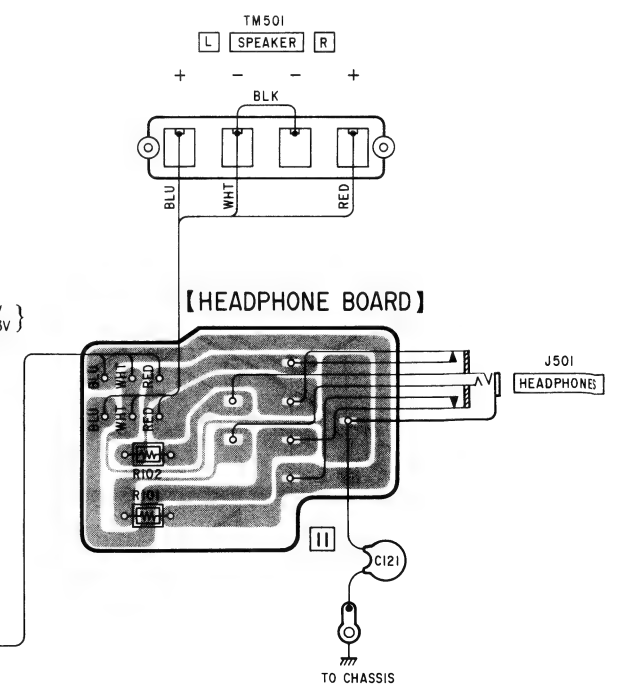
AEP, UK MODEL



【POWER SUPPLY BOARD】

$$\left\{ \begin{array}{l} \text{AEP, UK} : 34\text{V} \\ \text{E} : 32.3\text{V} \end{array} \right\}$$


【HEADPHONE BOARD】



Note:

- ○—: parts extracted from the component side.
- ■ : B+ pattern

IC Q	105 103 106 104	101 102	IC101				
D		107 108	101 103 104 102	105 106	110 111	109	

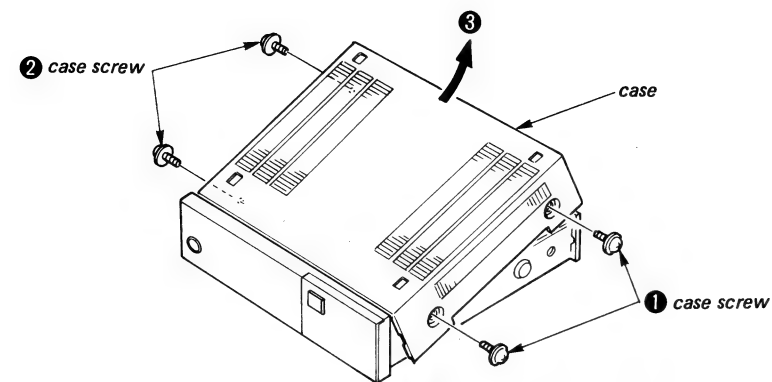
SECTION 2 DISASSEMBLY

**FH-7
AC-78**

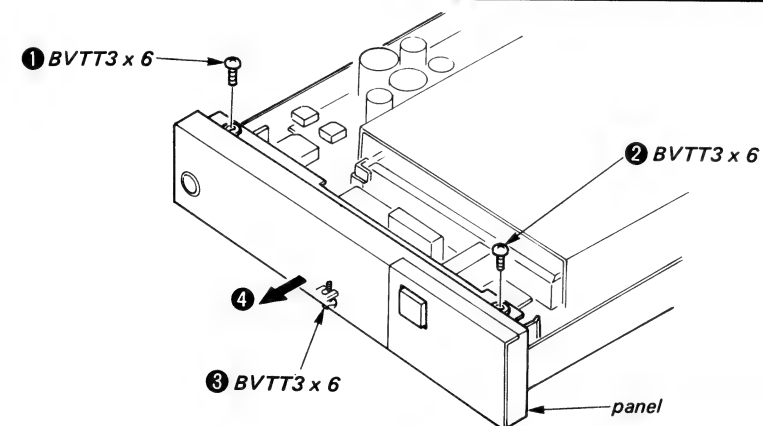
**FH-7
AC-78**

Note: Follow the disassembly procedure in the numerical order given.

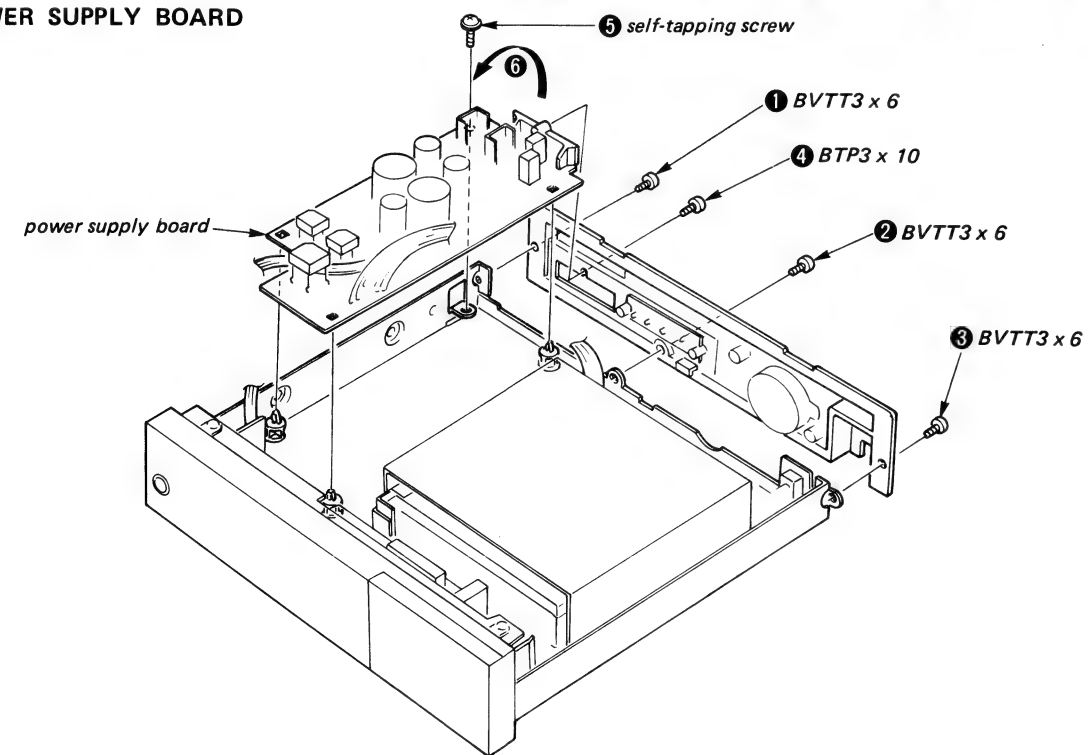
CASE



PANEL

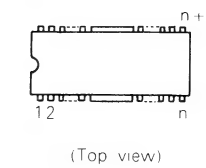


POWER SUPPLY BOARD

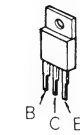


SEMICONDUCTOR LEAD LAYOUTS

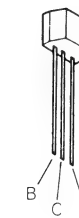
NJM4560D-D



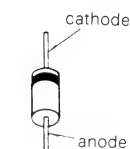
**2SA770-Y
2SC1985-Y**



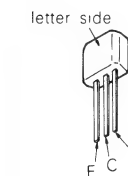
**2SC2458
2SC2458-GR**



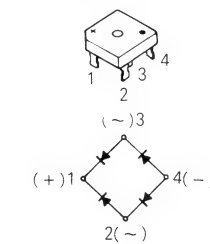
**1S1585
1S2076A
30DL4
30DL4FA
EQA01-12R1**



**2SA1175
2SA1175-F**



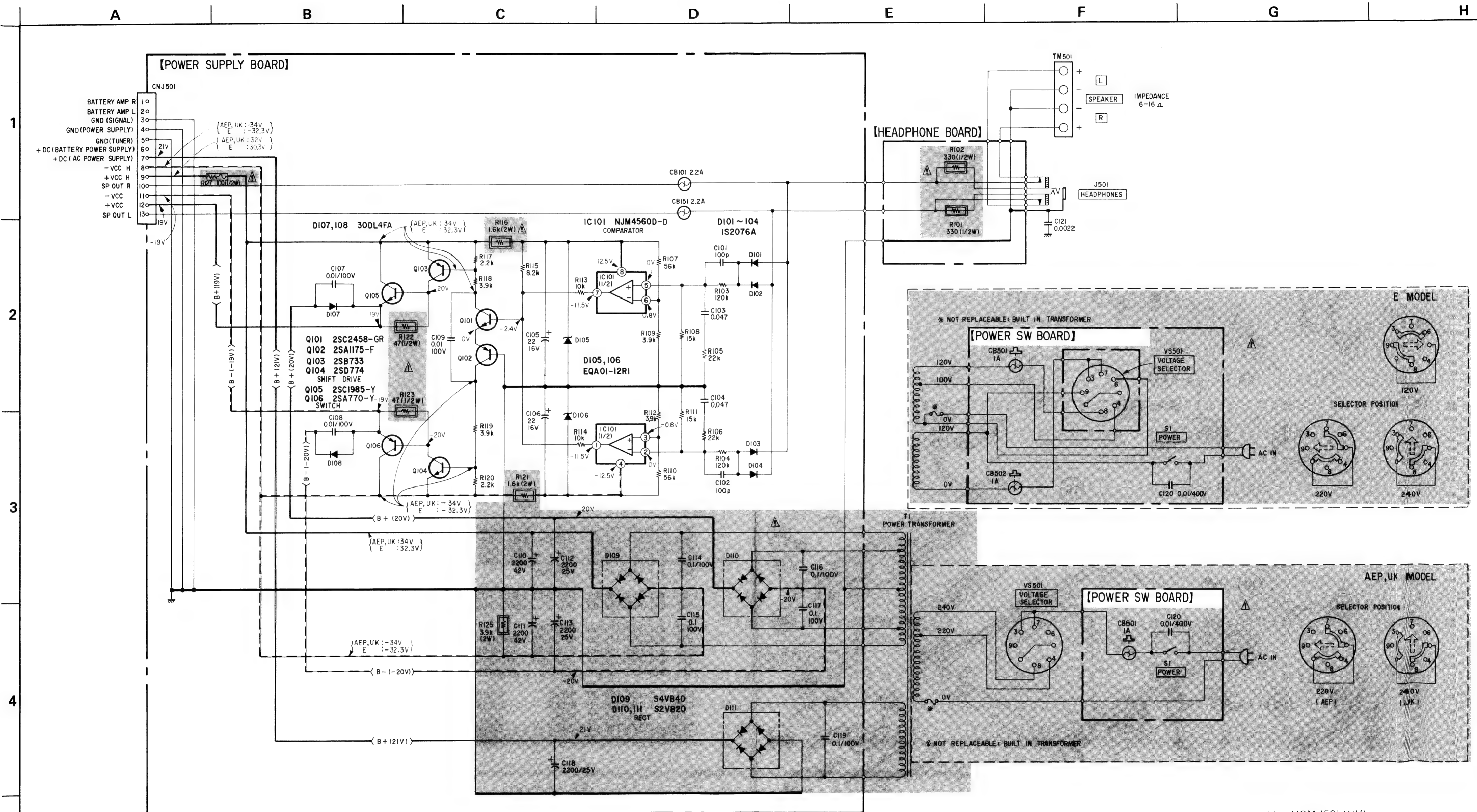
**S2VB20
S4VB40**



**2SB733
2SD774**



3-2. SCHEMATIC DIAGRAM



Note:

- All capacitors are in μF unless otherwise noted. pF : μF 50WV or less are not indicated except for electrolytics and tantalums.
- All resistors are in ohms, $\frac{1}{4}\text{W}$ unless otherwise noted. k Ω : 1000 Ω , M Ω : 1000 k Ω
- : nonflammable resistor.

- : fusible resistor.
- : panel designation.
- : B+ bus.
- : B- bus.
- Voltages are dc with respect to ground unless otherwise noted.

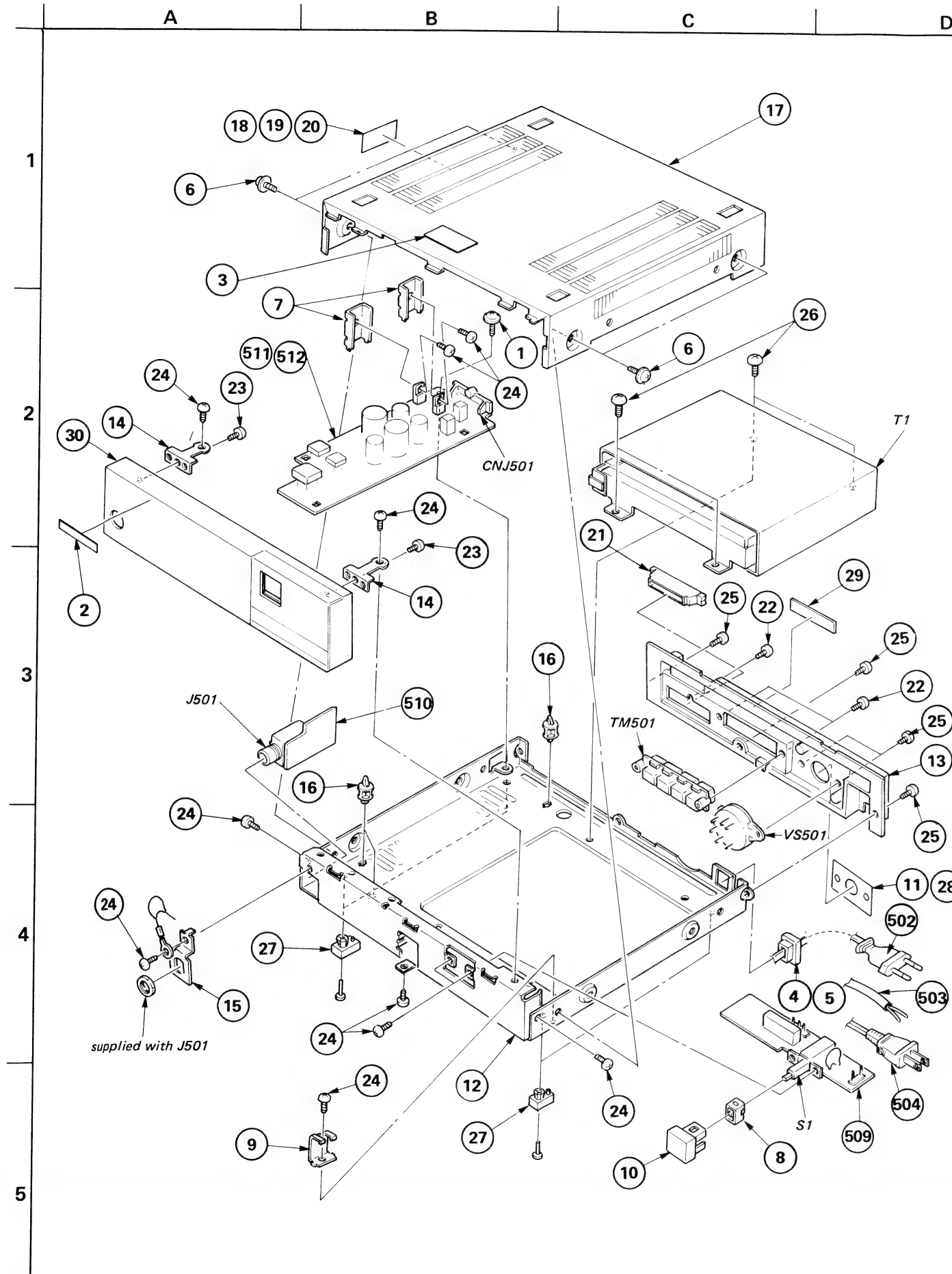
- Readings are taken with a VOM (50k Ω /V).
- Voltage variations may be noted due to normal production tolerances.

Note: The components identified by shading and mark Δ are critical for safety. Replace only with part number specified.

SECTION 4 EXPLODED VIEW AND PARTS LIST

FH-7
AC-78

FH-7
AC-78



GENERAL SECTION

No.	Part No.	Description
1	3-701-589-00	SCREW, SELF-TAPPING
2	3-701-690-00	(UK).....LABEL (MADE IN JAPAN)
3	3-703-043-21	(UK).....LABEL, CAUTION, MAIN
4	3-703-244-00	(AEP,UK)....BUSHING, CORD
5	3-703-571-00	(E).....BUSHING (S), CORD
6	3-703-354-11	SCREW (OS), CASE, CLAW
7	4-854-790-00	HEAT SINK
8	4-864-307-00	RING
9	4-884-808-00	(AEP,UK)....PROTECTOR
10	4-884-810-00	KNOB (16X16) (POWER), SQUARE
11	4-884-812-00	(AEP,UK)....LABEL
12	4-884-815-00	CHASSIS
13	4-884-816-00	PLATE, JACK
14	4-884-820-00	BRACKET (B)
15	4-884-824-00	BRACKET, H.P
16	4-884-834-00	SUPPORT, PC
17	4-884-841-00	CASE
18	4-884-867-00	LABEL, MODEL NUMBER (AEP)
19	4-884-868-00	LABEL, MODEL NUMBER (UK)
20	4-884-869-00	LABEL, MODEL NUMBER (E1/E2)
21	4-884-874-00	COVER, CONNECTOR (A)
22	7-685-547-19	SCREW +BTP 3X10 TYPE2 N-S
23	7-685-646-11	SCREW +BVT 3X8 TYPE2 N-S
24	7-685-871-01	SCREW +BVT 3X6 (S)
25	7-685-871-09	SCREW +BVT 3X6 (S)
26	7-685-880-01	SCREW +BVT 4X6 (S)
27	X-4884-801-0	FOOT ASSY, RUBBER
28	4-884-921-00	(E)....LABEL
29	4-884-920-00	LABEL
30	X-4884-812-1	PANEL ASSY

ELECTRICAL PARTS

Ref.No.	Part No.	Description
501	1-526-565-00	(E1)....AC PLUG ADAPTER
502	1-534-817-XX	(AEP)....CORD, POWER, EULO PLUG
503	1-551-628-00	(E)....CORD, POWER
504	1-551-884-00	(UK)....CORD, POWER
505	1-535-120-00	TERMINAL
506	1-535-140-00	(AEP,UK)....BASE POST 19MM (10MM PITCH)
507	1-535-142-00	(E).....BASE POST 19MM (10MM PITCH)
508	1-535-416-00	TERMINAL
509	1-608-445-00	PC BOARD, POWER SW
510	1-608-446-00	PC BOARD, HEADPHONE
511	A-4351-325-A	(AEP,UK)....MOUNTED PCB, POWER SUPPLY
512	A-4351-326-A	(E).....MOUNTED PCB, POWER SUPPLY
C107	1-106-196-00	MYLAR 0.01MF 5% 100V
C108	1-106-196-00	MYLAR 0.01MF 5% 100V
C109	1-106-196-00	MYLAR 0.01MF 5% 100V
C110	1-124-166-00	ELECT 2200MF 20% 42V
C111	1-124-166-00	ELECT 2200MF 20% 42V

NOTE:

- Items with no part number and no description are not stocked because they are seldom required for routine service.
- Items marked "▲" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- Due to standardization, parts with part numbers (Δ-ΔΔΔ-ΔΔΔ-XX or Δ-ΔΔΔΔ-ΔΔΔ-X) may be different from those used in the set.

CAPACITORS:

All capacitors are in μF. Common capacitors are omitted. Refer to the following lists for their part numbers.
MF:μF, PF:μμF.

RESISTORS

All resistors are in ohms. Common 1/4W, 1/8W and 1/16W carbon resistors are omitted. Refer to the following lists for their part numbers.

F : nonflammable

COILS

MMH : mH, UH : μH

ELECTRICAL PARTS

Ref.No.	Part No.	Description
C112	1-123-918-00	ELECT 2200MF 20% 25V
C113	1-123-918-00	ELECT 2200MF 20% 25V
C114	1-108-389-00	MYLAR 0.1MF 10% 100V
C115	1-108-389-00	MYLAR 0.1MF 10% 100V
C116	1-108-389-00	MYLAR 0.1MF 10% 100V
C117	1-108-389-00	MYLAR 0.1MF 10% 100V
C118	1-123-918-00	ELECT 2200MF 20% 25V
C119	1-108-389-00	MYLAR 0.1MF 10% 100V
C120	1-161-744-00	CERAMIC 0.01MF 400V
CB101	1-532-564-00	BREAKER, CIRCUIT
CB151	1-532-564-00	BREAKER, CIRCUIT
CB501	1-532-535-00	CIRCUIT BREAKER
CB502	1-532-535-00	(E)....CIRCUIT BREAKER
CNJ501	1-562-068-00	SOCKET, CONNECTOR 13P
D101	8-719-815-85	DIODE 1S1585
D102	8-719-815-85	DIODE 1S1585
D103	8-719-815-85	DIODE 1S1585
D104	8-719-815-85	DIODE 1S1585
D105	8-719-991-21	DIODE EQA01-12R1
D106	8-719-991-21	DIODE EQA01-12R1
D107	8-719-230-24	DIODE 30DL4
D108	8-719-230-24	DIODE 30DL4
D109	8-719-504-40	DIODE S4VB40
D110	8-719-502-20	DIODE S2VB20
D111	8-719-502-20	DIODE S2VB20
IC101	8-759-745-61	IC NJM4560D-0
J501	1-507-689-00	JACK, LARGE TYPE
Q101	8-729-245-83	TRANSISTOR 2SC2458
Q102	8-729-117-54	TRANSISTOR 2SA1175
Q103	8-729-113-32	TRANSISTOR 2SB733
Q104	8-729-177-43	TRANSISTOR 2SD774
Q105	8-729-300-44	TRANSISTOR 2SC1985-Y
Q106	8-729-300-42	TRANSISTOR 2SA770-Y
R101	1-247-228-00	CARBON 330 5% 1/2W F
R102	1-247-228-00	CARBON 330 5% 1/2W F
R116	1-206-669-00	METAL 1.6K 5% 2W F
R121	1-206-669-00	METAL 1.6K 5% 2W F
R122	1-247-208-00	CARBON 47 5% 1/2W F
R123	1-247-208-00	CARBON 47 5% 1/2W F
R125	1-206-678-00	METAL 3.9K 5% 2W F
R127	1-212-982-00	FUSIBLE 100 5% 1/2W F
S1	1-553-318-00	SWITCH, PUSH (AC POWER)
T1	1-447-408-00	(E).....TRANSFORMER, POWER
T1	1-447-407-00	(AEP,UK)....TRANSFORMER, POWER
TM501	1-536-705-21	TERMINAL BOARD (SP)
VS501	1-526-576-51	SELECTOR, POWER VOLTAGE

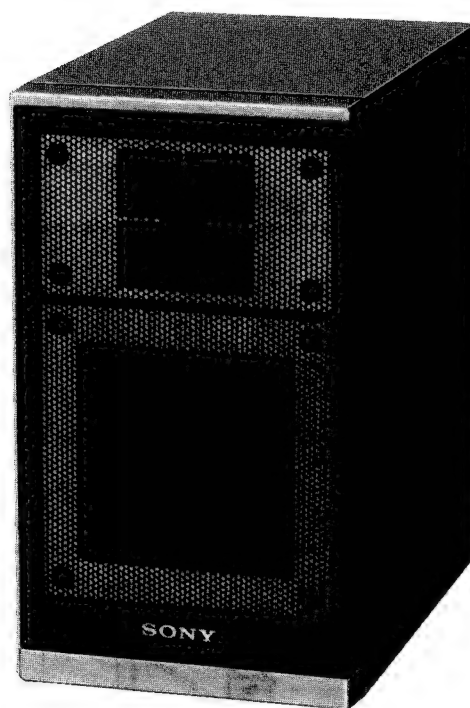
SEMICONDUCTORS

In each case, U : μ, for example:
UA.... : μA...., UPA.... : μPA...., UPC.... : μPC,
UPD.... : μPD....

The components identified by shading and mark ▲ are critical for safety. Replace only with part number specified.

SPEAKER SYSTEM

[SS-78]



Note: SS-78 is a speaker system in FH-7.

FEATURES

- 2-way, 2-speaker bass reflex type speaker system.
- Attachments included for mounting or using as portables.
- Designed for high sound quality in spite of small size.

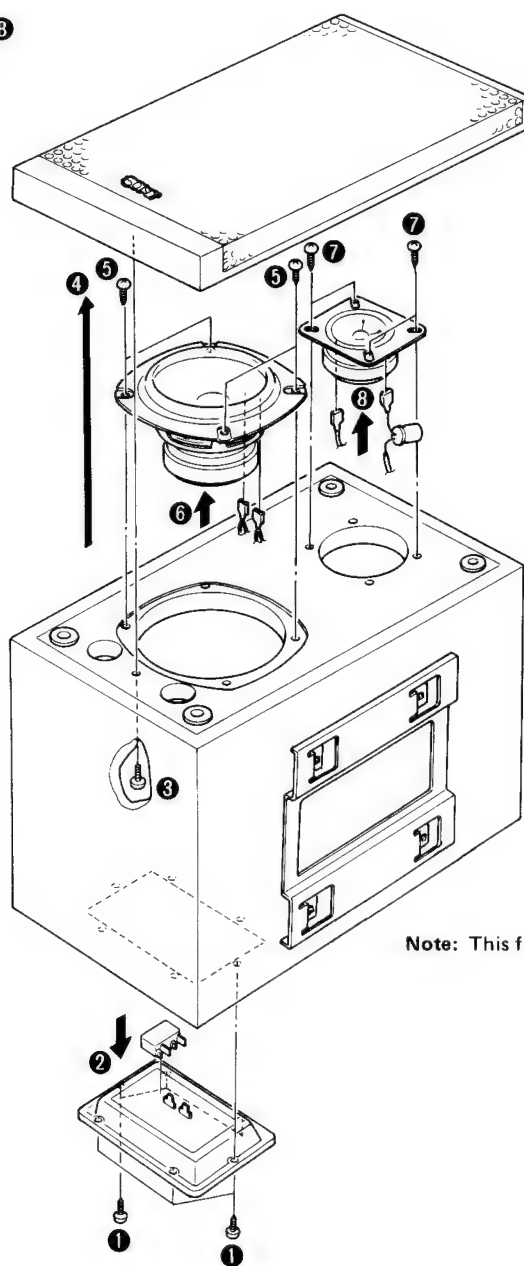
1. DISASSEMBLY

SPEAKER UNIT REMOVAL

Note: Follow the disassembly procedure in the numerical order given.

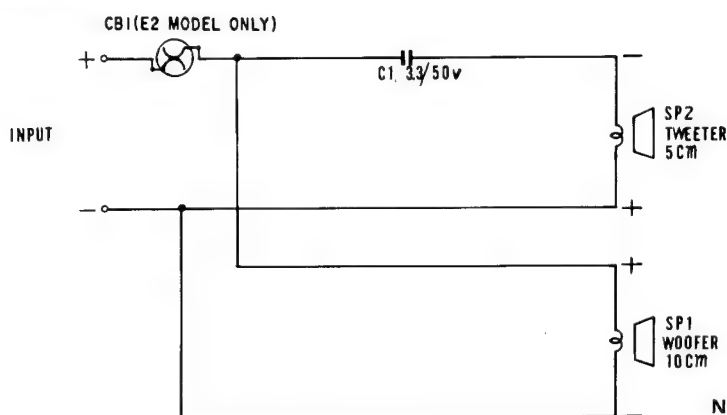
Woofer: ① - ⑥

Tweeter: ① - ④, ⑦, ⑧



Note: This figure illustrates the LEFT enclosure.

2. SCHEMATIC DIAGRAM

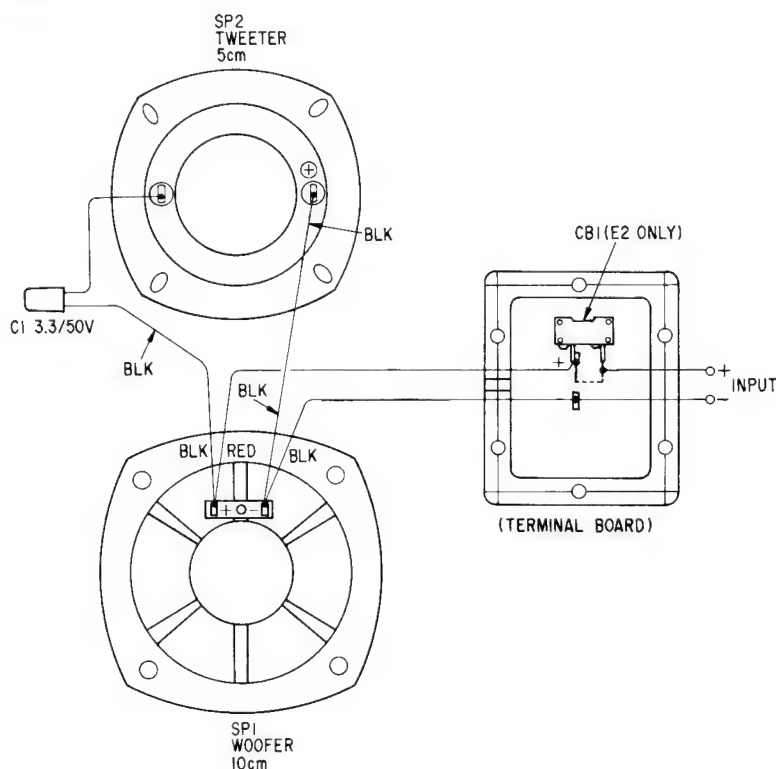


Note: All capacitors are in μF .

CAUTION:

Be careful to the polarity of the speaker when connecting the speaker.

3. WIRING DIAGRAM



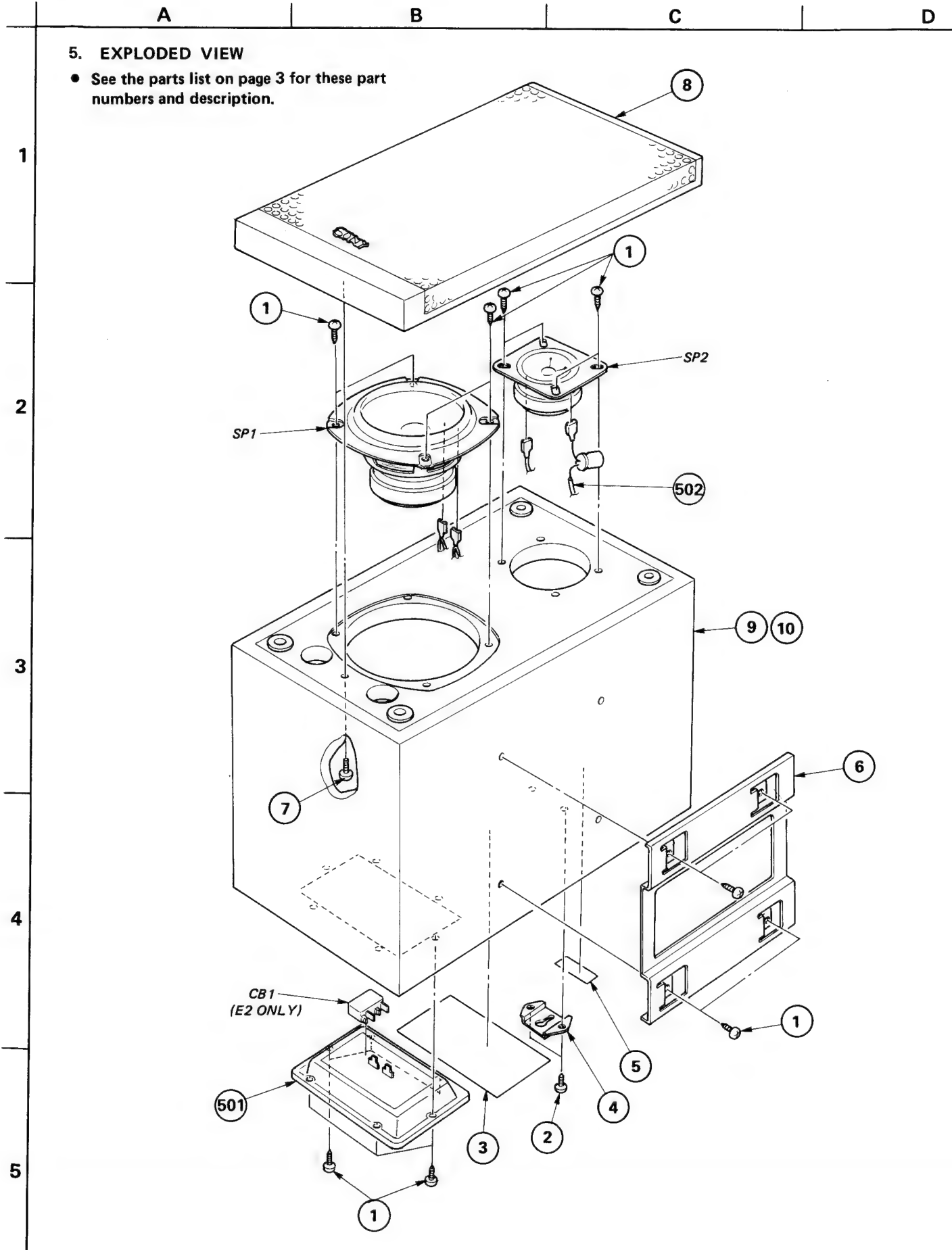
4. PARTS LIST

GENERAL SECTION		
No.	Part No.	Description
1	4-874-614-11	SCREW +BVTP 3.5X14
2	4-874-614-21	SCREW +BVTP 3.5X14
3	4-875-621-00	LABEL, CAUTION
4	4-883-903-00	HOOK
5	4-883-911-00	LABEL, MODEL NUMBER
6	4-883-913-00	PLATE, SIDE (B)
7	4-883-918-01	SCREW TP +BVWH 4X23
8	X-4883-901-0	PANEL ASSY, FRONT
9	X-4883-902-0	BOX ASSY (LEFT), SPEAKER
10	X-4883-903-0	BOX ASSY (RIGHT), SPEAKER

ELECTRICAL PARTS		
Ref.No.	Part No.	Description
501	1-536-740-00	TERMINAL BOARD, SPEAKER
502	1-556-472-11	CORD, SPEAKER (WITH CAPACITOR)
CB1	1-532-664-00	(E2 ONLY)...BREAKER, CIRCUIT (1.25A)
SP1	1-503-168-00	SPEAKER (WOOFER) 10CM
SP2	1-503-169-00	SPEAKER (TWEETER) 5CM

NOTE:

Items marked "●" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.



POWER SUPPLY UNIT (AC-78)

FH-7 AC-78

AEP Model
UK Model

SUPPLEMENT




File this supplement with the service manual.

No. 1

October, 1982

SERIAL NUMBER : 720,001 AND LATER

CIRCUIT CHANGE

Ref. No.	Part Number	Description	Remarks
C107	1-106-196-00	MYLAR 0.01MF 5% 100V	Deleted
C108	1-106-196-00	MYLAR 0.01MF 5% 100V	Deleted
R128	 1-212-354-00	METAL 0.33 10% 1W	Added
R129	 1-532-675-00	CIRCUIT PROTECTOR	Added
R130	 1-532-675-00	CIRCUIT PROTECTOR	Added

• PART CHANGE


[FORMER]

[NEW]

Ref. No. Description
Q103 2SB733



Ref. No. Part Number Description
Q103 8-729-103-43 TRANSISTOR 2SB734

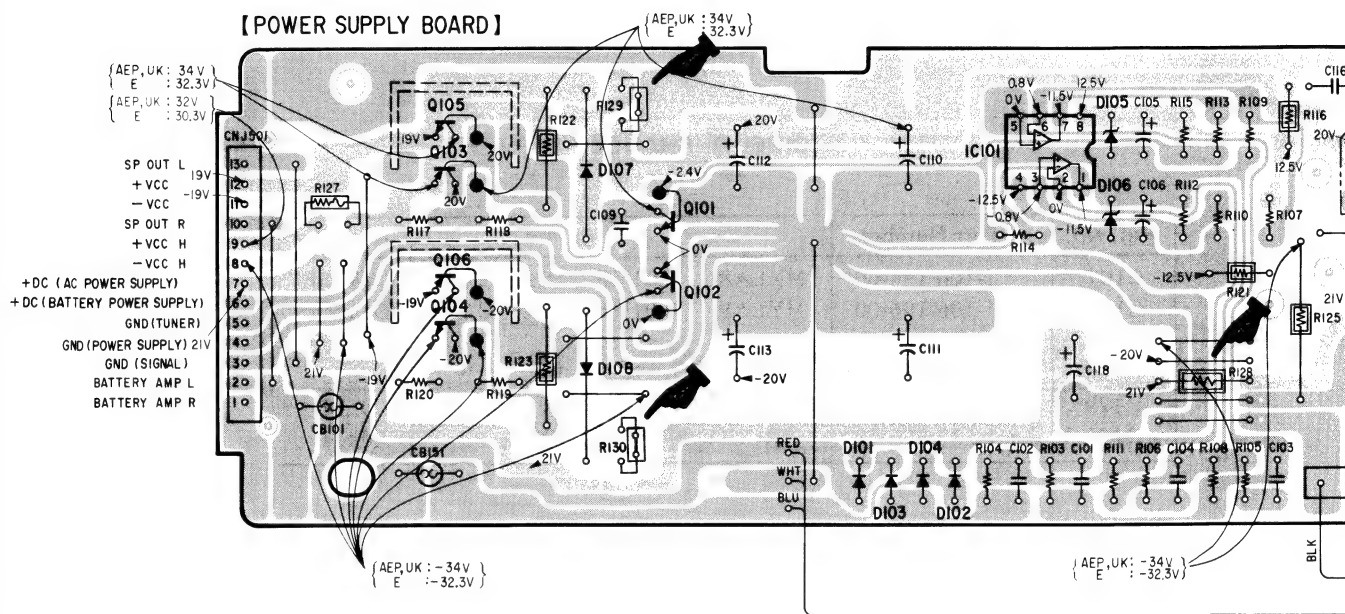
The components identified by shading and mark  are critical for safety. Replace only with part number specified.

SONY® SERVICE MANUAL

MOUNTING DIAGRAM

Page: AC-7, 8

 : changed portion

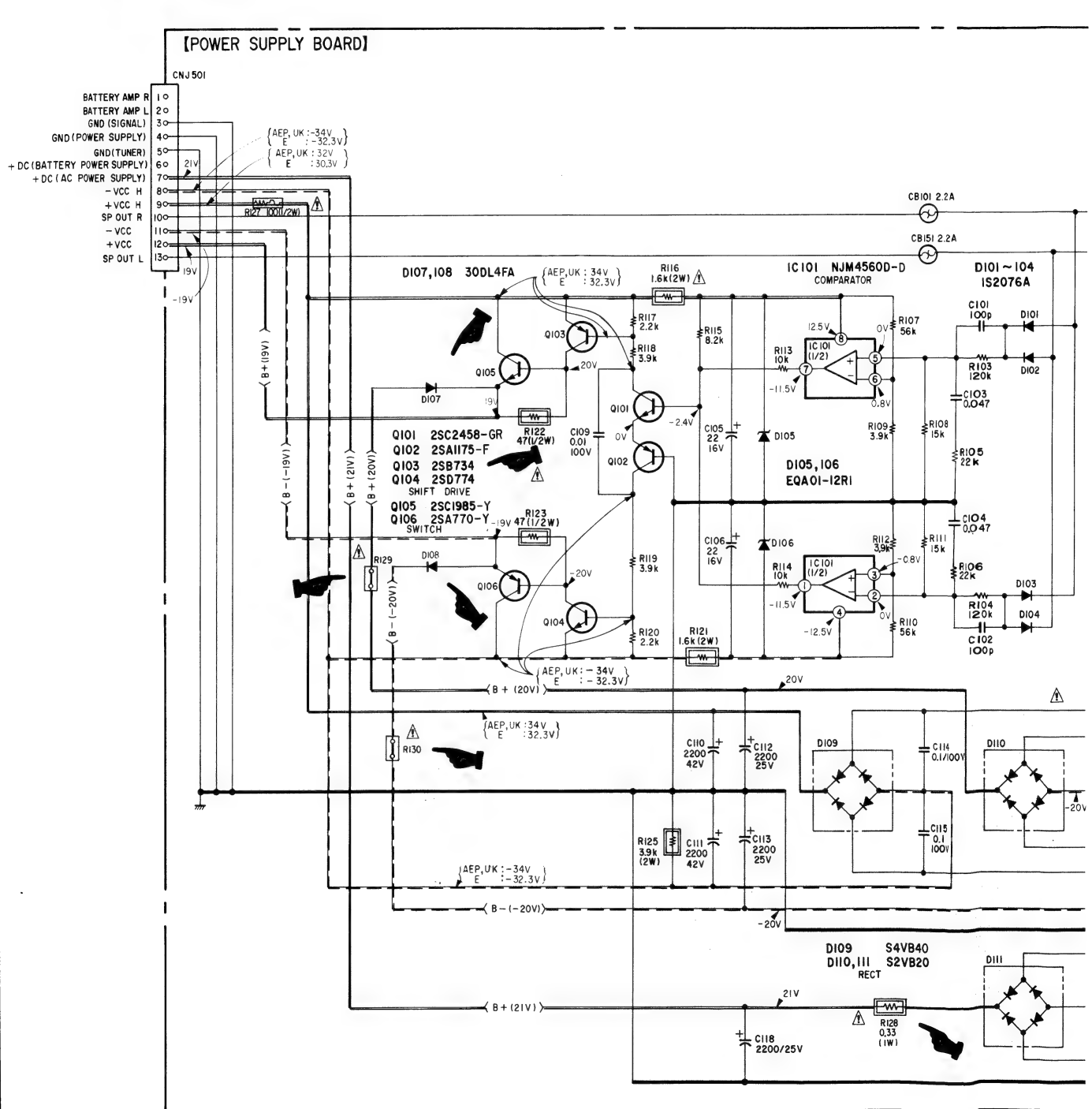



IC	105 103	101	IC101
Q	106 104	102	
D		107 108	105 106
		101 103 104 102	

SCHEMATIC DIAGRAM

Page: AC-9, 10

 : changed portion



Note: The components identified by shading and mark  are critical for safety. Replace only with part number specified.

FH-7
AC-78

9-950-987-81

Sony Corporation
Consumer Products Group
Technical Support Dept.

—AC-4—

English
83E0405-2
Printed in Japan
© 1982

STEREO CASSETTE DECK (TC-78)

FH-7 TC-78

AEP Model
UK Model
E Model

SUPPLEMENT

File this supplement with the service manual.

No. 2
February, 1983

SYSTEM CONTROL CIRCUIT AND MECHANISM CHANGE

- Applicable Serial No.:
 - AEP Model: 503,301 and later
 - UK Model: 609,501 and later
 - E1 Model: 322,901 and later
 - E2 Model: 405,401 and later
- System control circuit and board have been changed.
- Tape transport mechanism type has been changed.



- Owing to these changes, pause mechanism can be operated when tape is played back even in reverse mode.

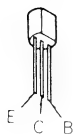


SONY[®]

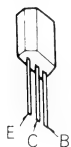
SERVICE MANUAL

SEMICONDUCTOR LEAD LAYOUTS

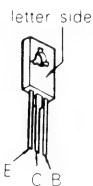
2SA1015
2SC1345
2SC1364
2SC2001



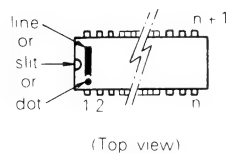
2SA1027R
2SA1175
2SC2785



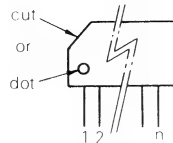
2SD809



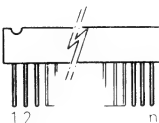
CX174A
MB84069UB
TC9310N-013
μPD4011C



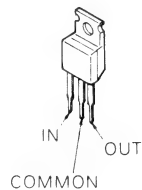
LB1403
NJM4558S



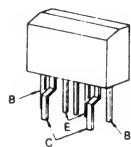
BA328



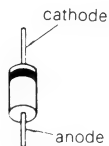
NJM78M05A



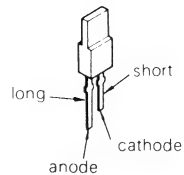
μPA74V-FA



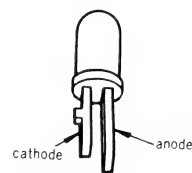
10E2
1S1555
HZ6B1L



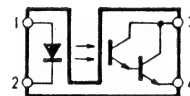
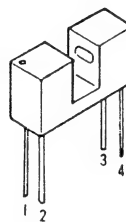
SLP251B



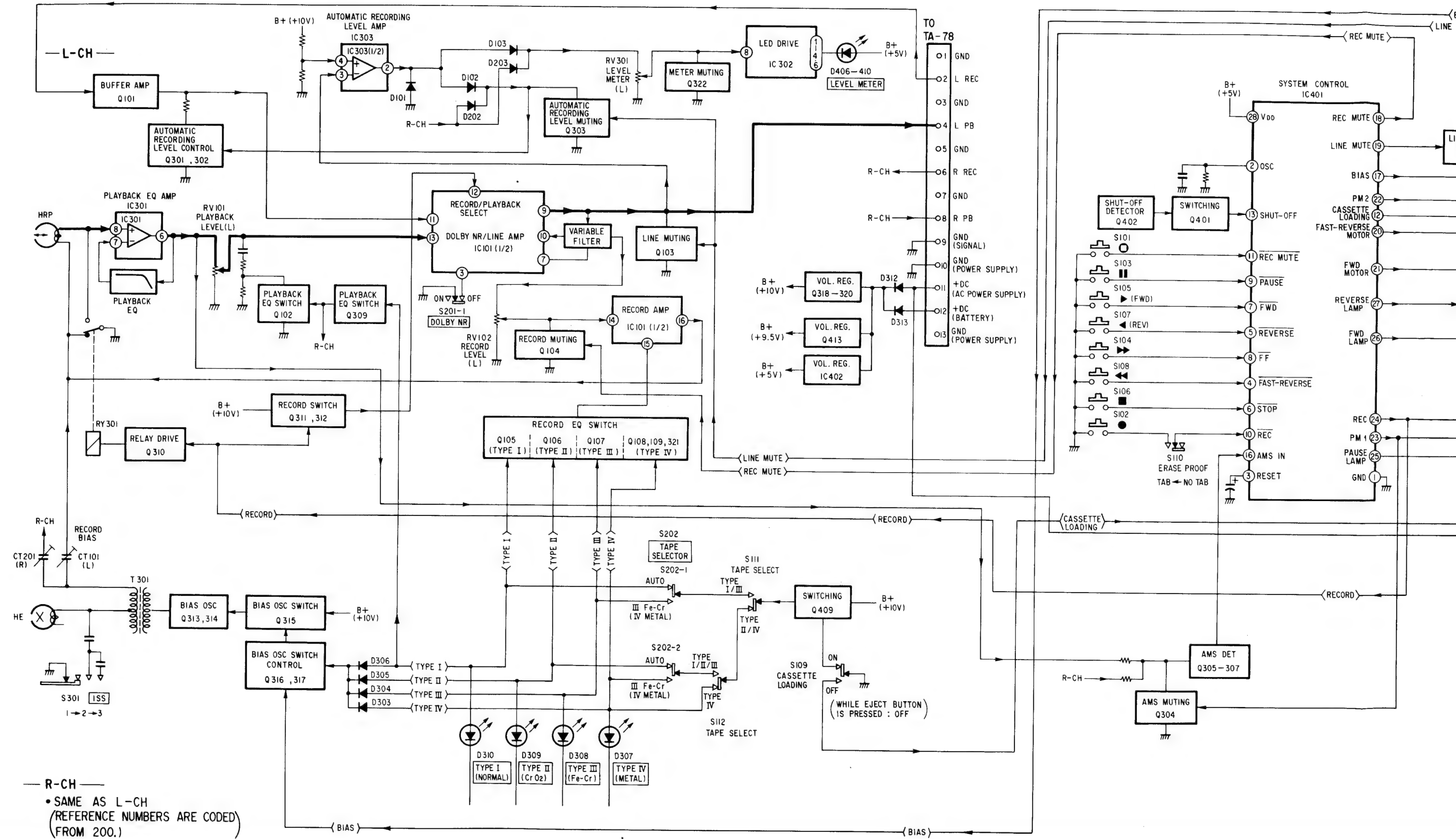
SLR34DC5
SLR34PC5
SLR34URC5



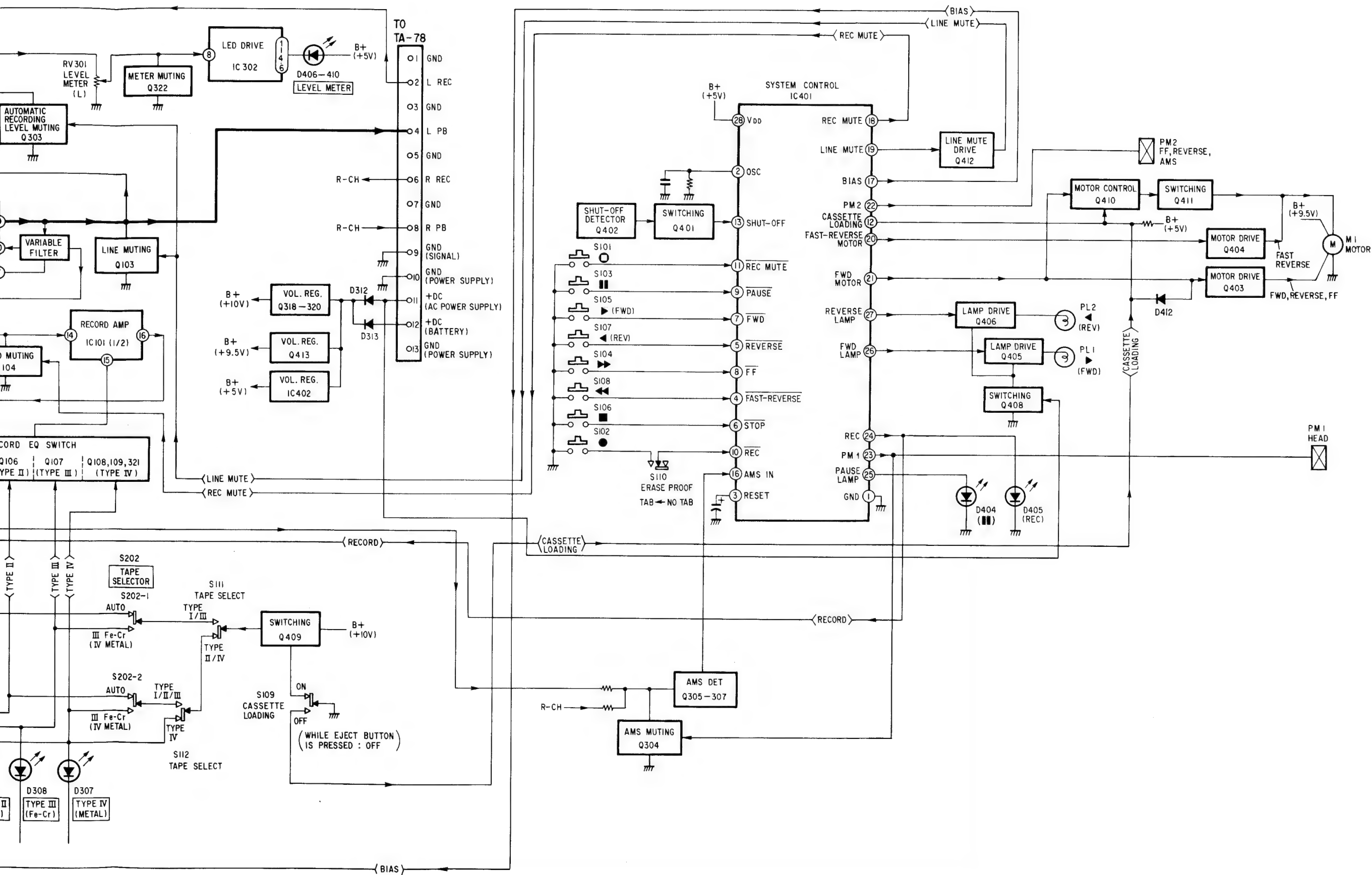
SPI201

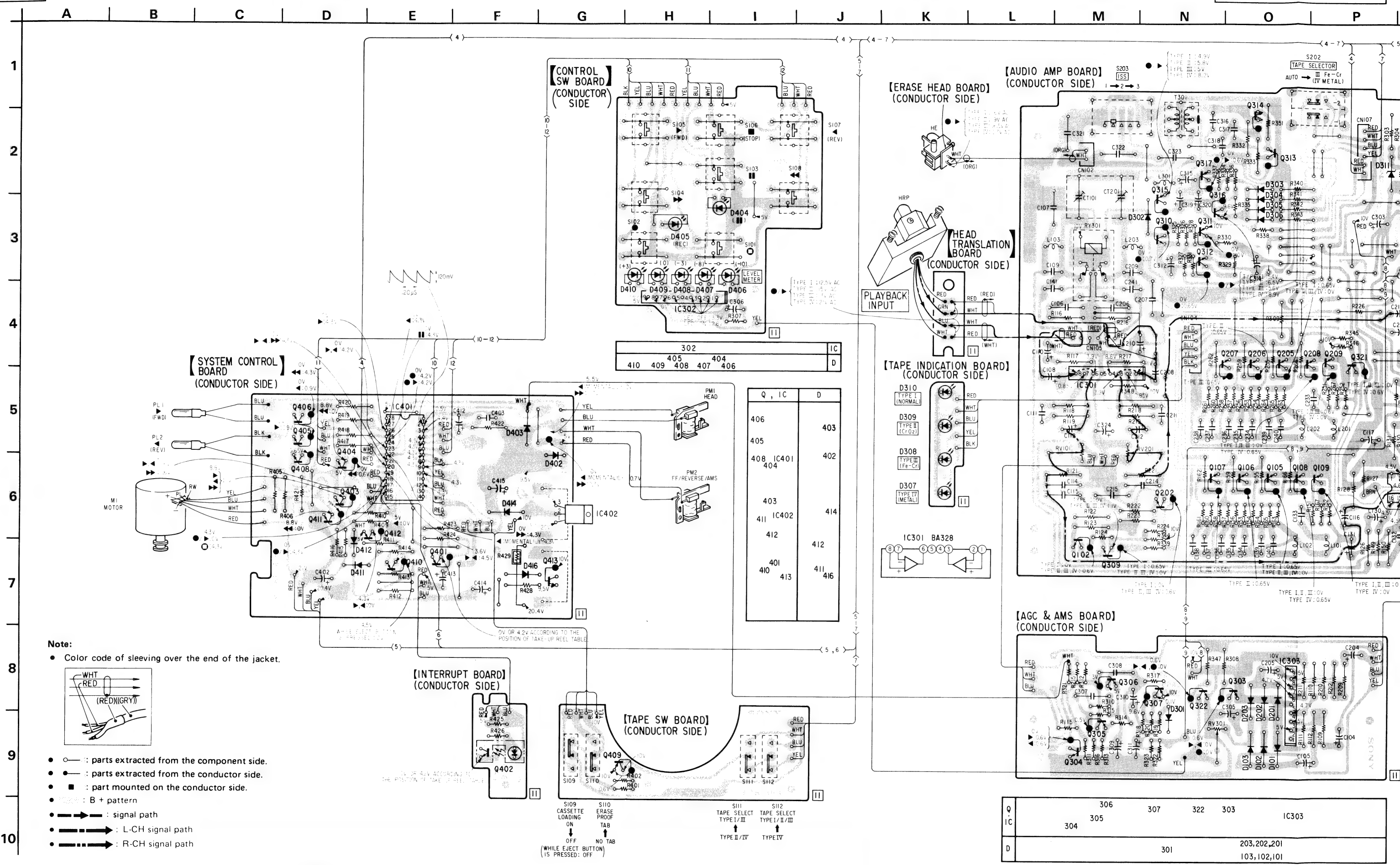


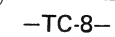
BLOCK DIAGRAM



R-CH
• SAME AS L-CH
(REFERENCE NUMBERS ARE CODED)
(FROM 200.)







IC101,201 CX174A

V/I CONVERTER

DETECTOR

SENSING AMP

OVERSHOOT AMP

VARIABLE RESISTOR

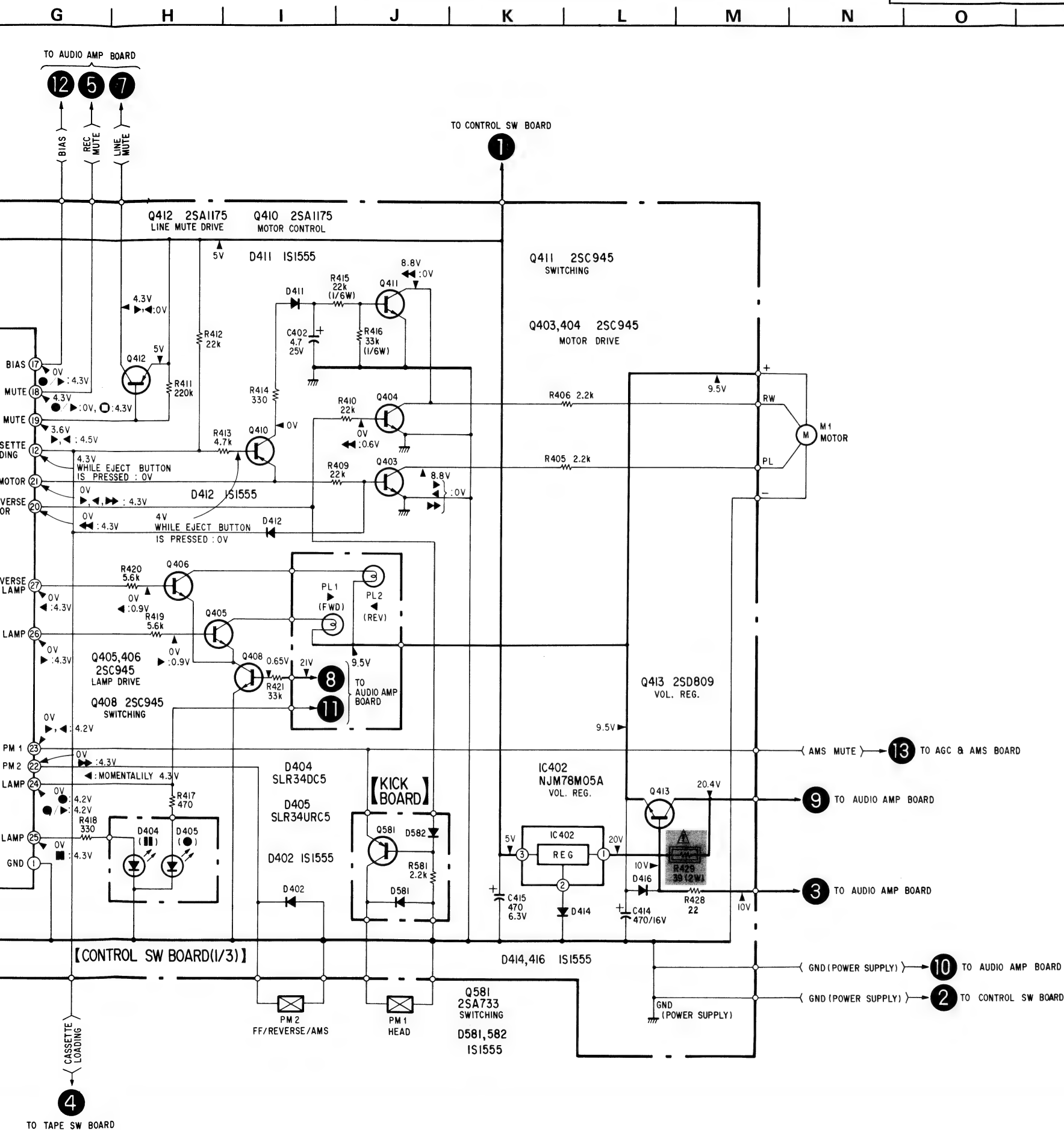
OVERSHOOT LIMITER

BIAS CIRCUIT

INPUT AMP SWITCH

RECORD AMP

-TC-13-



NOTE FOR SCHEMATIC DIAGRAM
— Audio Amp Section —

Note:

- Components for right channel have same values as for left channel. Reference numbers are coded from 200.
- All capacitors are in μF unless otherwise noted. pF : $\mu\mu F$ 50WV or less are not indicated except for electrolytics and tantalums.
- All resistors are in ohms, $\frac{1}{4}W$ unless otherwise noted. k Ω : 1000 Ω , M Ω : 1000 k Ω
- : adjustment for repair.
- : B+ bus.
- Readings are taken under no-signal conditions.
- No mark: STOP
- ▶ : FWD
- ◀ : REV
- ▶▶ : FF
- ◀◀ : FAST-REVERSE
- : REC
- ▶ : REC FWD
- : REC MUTE
- || : PAUSE
- : signal path

• Switch

Ref. No.	Switch	Position
S109	CASSETTE LOADING	ON
S111	TAPE SELECTOR	TYPE II/IV
S112	TAPE SELECTOR	TYPE IV
S201	DOLBY NR	OFF
S202	TAPE SELECTOR	AUTO
S203	ISS	1

— System Control Section —

Note:

- All capacitors are in μF unless otherwise noted. pF : $\mu\mu F$ 50WV or less are not indicated except for electrolytics and tantalums.
- All resistors are in ohms, $\frac{1}{4}W$ unless otherwise noted. k Ω : 1000 Ω , M Ω : 1000 k Ω
- : nonflammable resistor.
- : B+ bus.
- Readings are taken under no-signal conditions.
- No mark: STOP
- ▶ : FWD
- ◀ : REV
- ▶▶ : FF
- ◀◀ : FAST-REVERSE
- : REC
- ▶ : REC FWD
- : REC MUTE
- || : PAUSE

• Switch

Ref. No.	Switch	Position
S101	○ (REC MUTE)	OFF
S102	● (REC)	OFF
S103	|| (PAUSE)	OFF
S104	▶▶ (FF)	OFF
S105	▶ (FWD)	OFF
S106	■ (STOP)	OFF
S107	◀ (REV)	OFF
S108	◀◀ (FAST-REVERSE)	OFF
S110	ACCIDENTAL-ERASURE PREVENTION	NO TAB

Note: Voltages are measured with a VOM (50k Ω/V).

Applicable Serial No.:
AEP Model: 503,301 and later
UK Model: 609,501 and later

E1 Model: 322,901 and later
E2 Model: 405,401 and later

FH-7
TC-78

FH-7
TC-78

Applicable Serial No.:
AEP Model: 503,301 and later
UK Model: 609,501 and later

E1 Model: 322,901 and later
E2 Model: 405,401 and later

SCHEMATIC DIAGRAM
— AUDIO AMP SECTION —

• See page TC-14 for Notes.

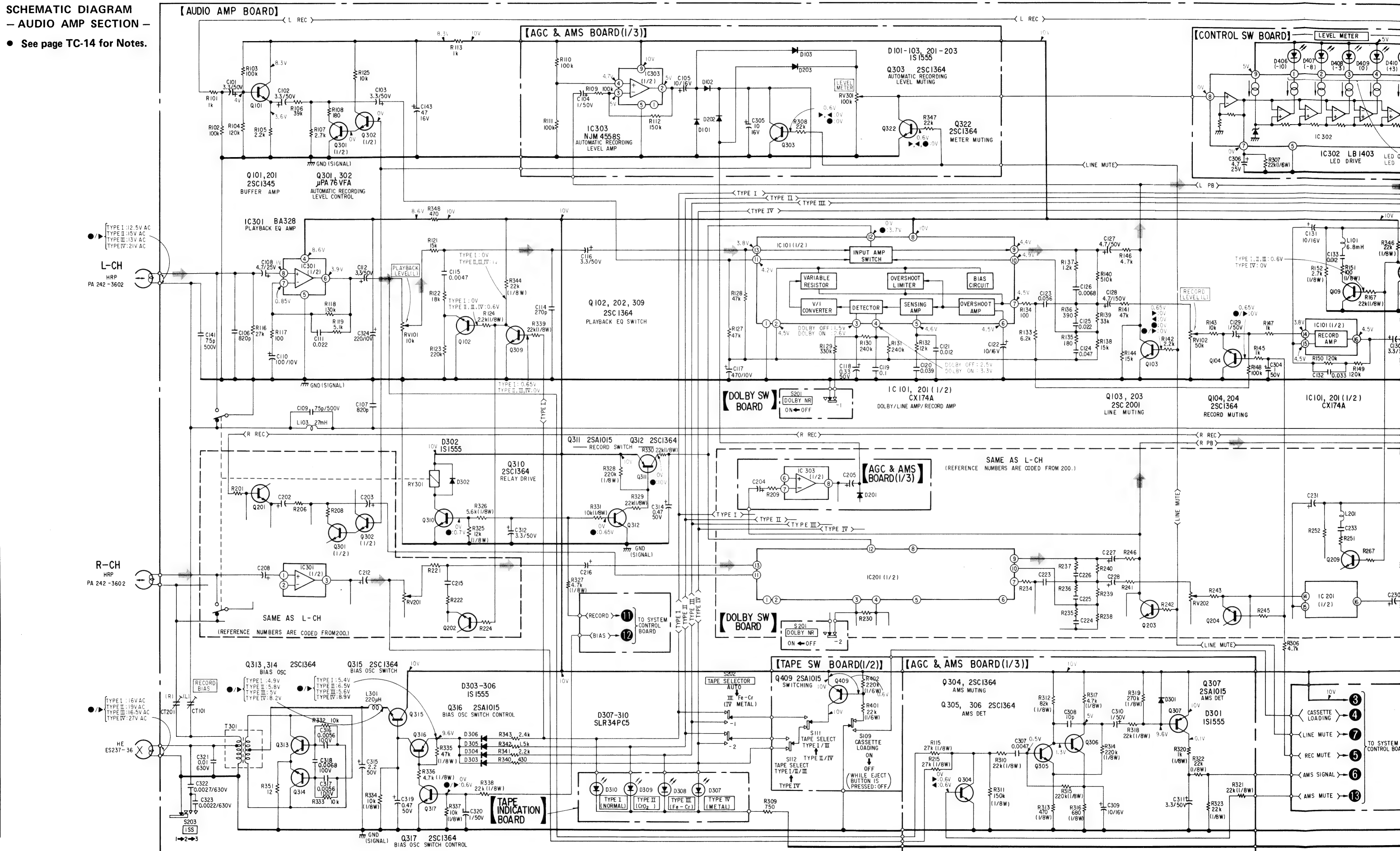
[AUDIO AMP BOARD]

[AGC & AMS BOARD (1/3)]

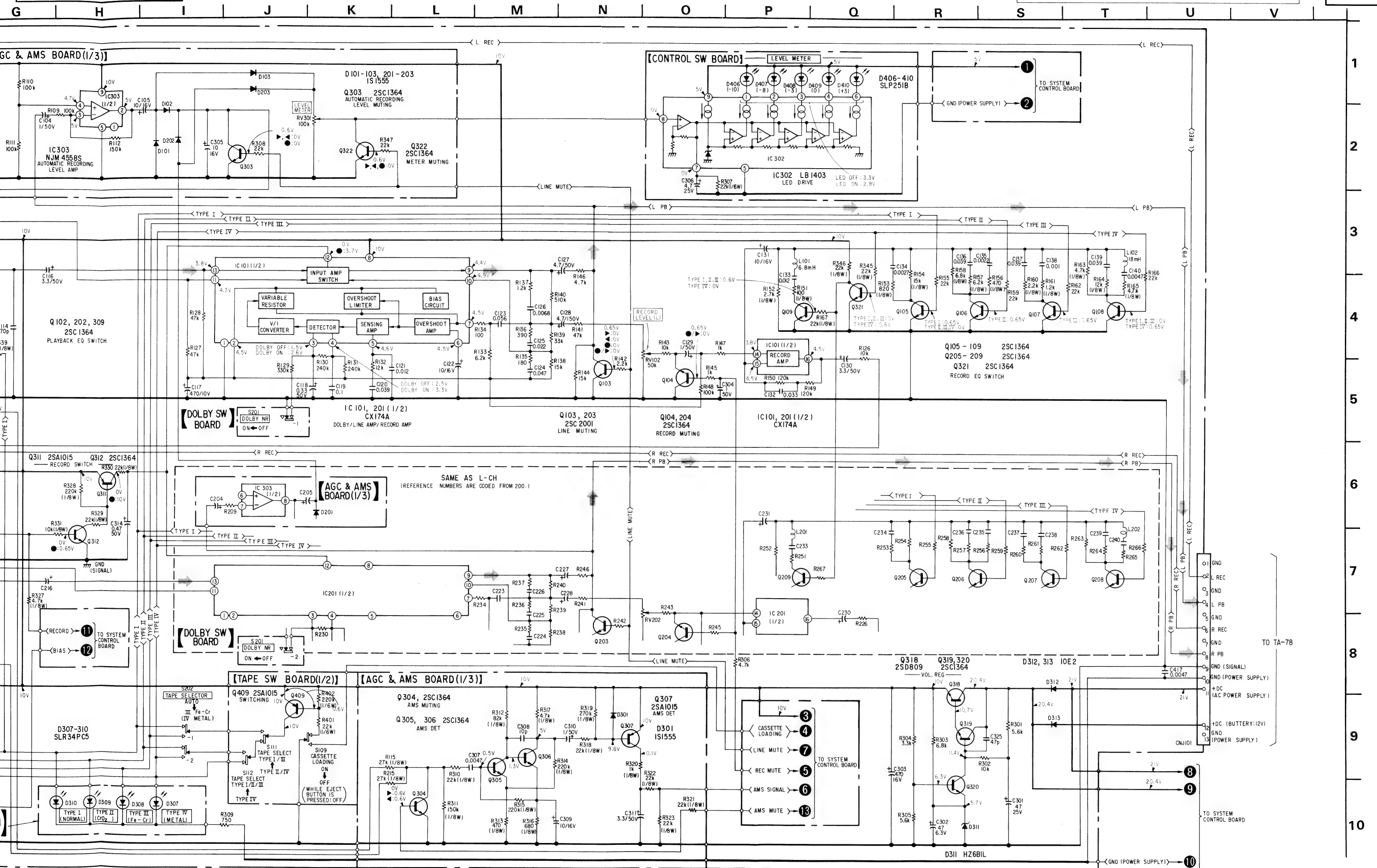
[CONTROL SW BOARD]

L-CH
HRP
PA 242-3602

R-CH
HRP
PA 242-3602



Note: Voltages are measured with a VOM (50k Ω /V).



Applicable Serial No.:

AEP Model: 503,301 and later

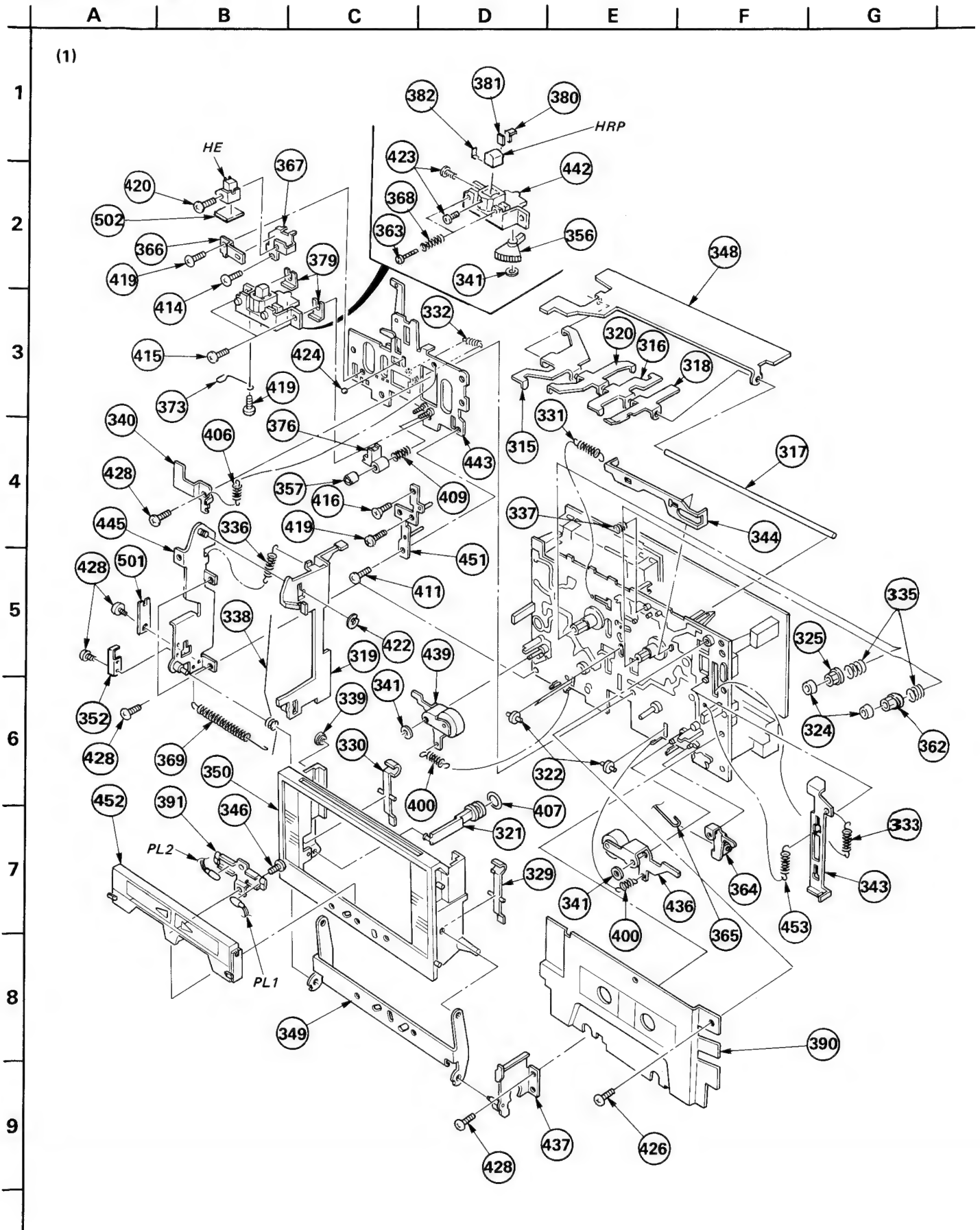
UK Model: 609,501 and later

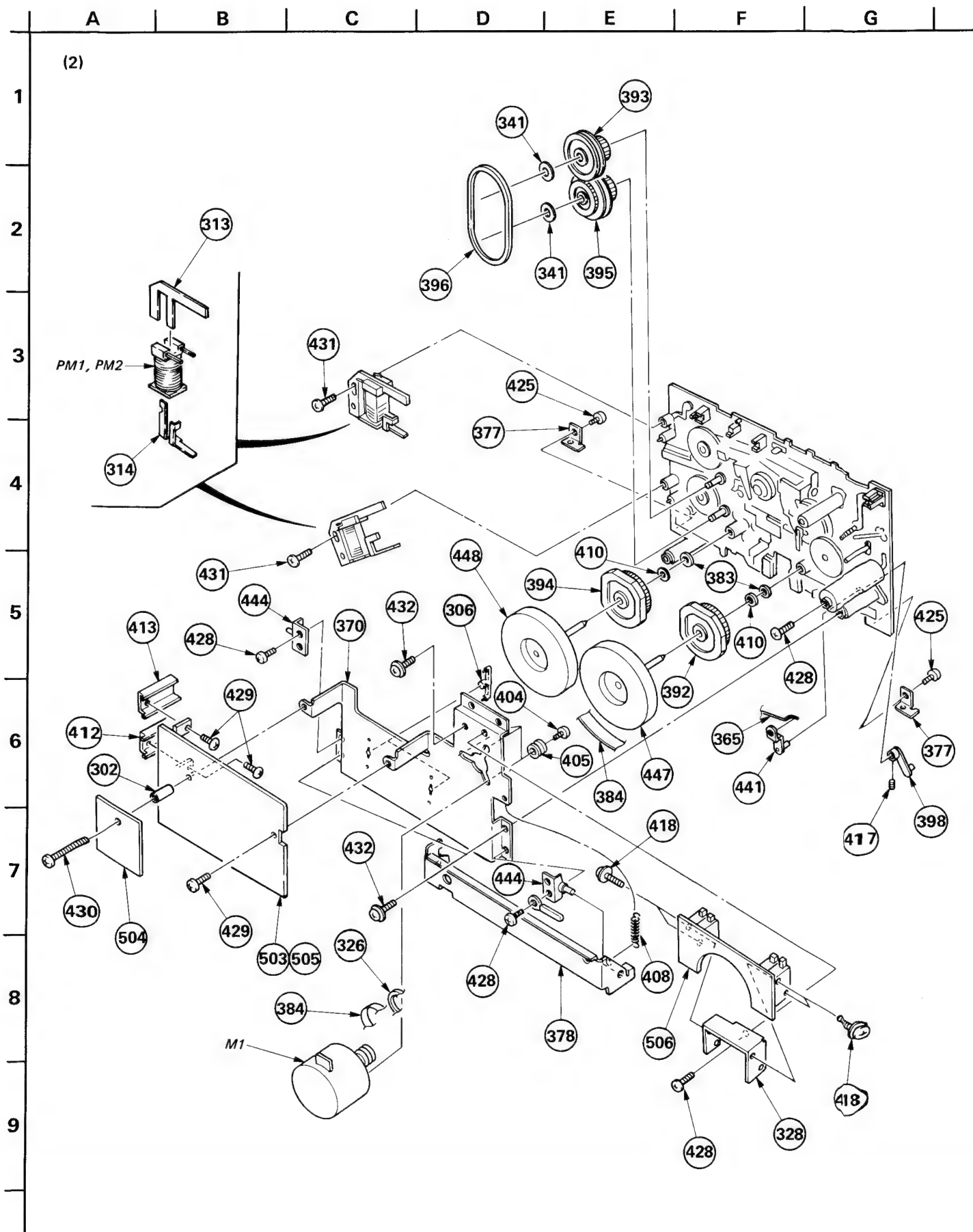
E1 Model: 322,901 and later

E2 Model: 405,401 and later

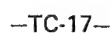
FH-7
TC-78

EXPLODED VIEWS





FH-7
TC-78



PARTS LIST

MECHANISM SECTION

No.	Part No.	Description
301	1-452-202-00	MAGNET
302	3-002-407-11	COLLAR
303	3-307-305-00	GEAR (T), REEL
304	♣;3-307-306-00	LEVER, SELECT, REVERSE
305	3-307-307-00	LEVER, FWD
306	3-307-309-00	RETAINER (A), THRUST
307	3-307-313-00	PLATE, YOKE
308	3-307-315-00	ARBOR, MOVABLE
309	3-307-319-00	RETAINER, TAKE-UP GEAR
310	3-307-328-00	LEVER, TAKE-UP SELECTION
311	♣;3-307-329-00	PLATE, FULCRUM, SELECTION LEVER
312	3-307-330-00	PIN, FULCRUM PLATE
313	3-307-332-00	ARBOR, FIXED
314	3-307-333-00	ARBOR, TRIGGER
315	♣;3-307-337-00	LEVER, REC DETECTION
316	♣;3-307-338-00	LEVER, METAL DETECTION
317	♣;3-307-339-00	SHAFT, DETECTION LEVER
318	♣;3-307-344-00	LEVER, HALF RETAINER
319	3-307-345-00	SLIDER, EJECT
320	♣;3-307-346-00	LEVER, DETECTION
321	3-307-347-00	PISTON
322	3-307-348-00	ROLLER
323	3-307-355-00	SPRING
324	3-307-362-00	CAP, REEL
325	3-307-363-00	CLAW (N), REEL
326	3-307-366-00	BELT, FAST FORWARD
327	3-307-367-00	BUSHING, SELECT LEVER
328	♣;3-307-370-00	BRACKET, SWITCH
329	3-307-371-00	SPRING (LEFT)
330	3-307-372-00	SPRING (RIGHT)
331	3-307-374-00	SPRING, TENSION
332	3-307-375-00	SPRING, TENSION
333	3-307-377-00	SPRING, TENSION
334	3-307-378-00	SPRING, TENSION
335	3-307-380-00	SPRING, COMPRESSION
336	3-307-381-00	SPRING, TENSION
337	3-307-382-00	SPRING
338	3-307-383-00	SPRING
339	3-307-390-00	BUSHING, LOADING SPRING
340	3-307-391-00	SPRING
341	3-307-394-00	RETAINER (B), THRUST
342	3-307-395-00	RETAINER, SPRING
343	3-307-397-00	SLIDER, PAUSE
344	♣;3-307-399-00	SLIDER, MODE
345	3-307-401-00	GEAR, FF CAM

MECHANISM SECTION

No.	Part No.	Description
346	7-685-533-19	SCREW +BTP 2.6X6 TYPE2 N-S
347	♣;3-307-403-00	SLIDER, FWD
348	♣;3-307-404-00	RETAINER, DETECTION SWITCH
349	♣;3-307-405-00	PLATE, FULCRUM, CASSETTE HOLDER
350	3-307-407-00	HOLDER, CASSETTE
351	3-307-412-00	GEAR, TAKE-UP REEL
352	3-307-416-00	STOPPER, LOADING
353	♣;3-307-420-00	SLIDER, REVERSE
354	♣;3-307-421-00	LEVER (R), FWD SELECTION
355	3-307-423-00	GEAR (S), DRIVING
356	3-307-427-00	GEAR, HEAD, ROTARY
357	3-307-435-00	NUT, ADJUSTMENT, TAPE GUIDE
358	♣;3-307-437-00	BLOCK, HEAD SELECTION
359	3-307-441-00	SPRING
360	♣;3-307-443-00	BRACKET, RETAINER, SUPPLY GEAR
361	♣;3-307-445-00	SHAFT, RETAINER, SUPPLY GEAR
362	3-307-447-00	CLAW (R), REEL
363	3-307-448-00	SCREW, ADJUSTMENT, AZIMUTH
364	♣;3-307-449-00	LEVER (R), PAUSE
365	♣;3-307-450-00	ROD, PULL, PAUSE
366	3-307-457-00	SPRING
367	3-307-458-00	PLATE (L), ADJUSTMENT, HEAD
368	3-307-460-00	SPRING, COMPRESSION
369	3-307-461-00	SPRING, TENSION
370	♣;3-307-462-00	RETAINER (R), THRUST
371	♣;3-307-464-00	RETAINER, SUPPLY GEAR
372	3-307-465-00	RETAINER, TAKE-UP
373	♣;3-307-466-00	CLAMP
374	♣;3-307-467-00	RETAINER, SPRING
375	3-307-469-00	LEVER, SELECTION, SUPPLY
376	3-307-470-00	GUIDE (L), TAPE
377	♣;3-307-472-00	BRACKET, MD
378	♣;3-307-474-00	LEVER (R2), EJECT
379	3-307-477-01	SEAM (A), HEAD ADJUSTMENT
379	3-307-477-11	SEAM (A), HEAD ADJUSTMENT
379	3-307-477-21	SEAM (A), HEAD ADJUSTMENT
379	3-307-477-31	SEAM (A), HEAD ADJUSTMENT
379	3-307-477-41	SEAM (A), HEAD ADJUSTMENT
380	3-307-479-01	SEAM (B), HEAD ADJUSTMENT
380	3-307-479-11	SEAM (B), HEAD ADJUSTMENT
380	3-307-479-21	SEAM (B), HEAD ADJUSTMENT
380	3-307-479-31	SEAM (B), HEAD ADJUSTMENT
381	3-307-480-02	SEAM, HEAD
382	3-307-481-00	BASE, HEAD
383	3-307-482-00	WASHER, LUMILER

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- Due to standardization, parts with part numbers (Δ-ΔΔΔ-ΔΔΔ-XX or Δ-ΔΔΔΔ-ΔΔΔ-X) may be different from those used in the set.

CAPACITORS:

- All capacitors are in μF. Common capacitors are omitted. Refer to the following lists for their part numbers.
MF:μF, PF:μμF.

RESISTORS

- All resistors are in ohms. Common 1/4W, 1/8W and 1/16W carbon resistors are omitted. Refer to the following lists for their part numbers.

- F : nonflammable

COILS

- MMH : mH, UH : μH

SEMICONDUCTORS

- In each case, U : μ, for example:
UA.... : μA...., UPA.... : μPA...., UPC.... : μPC,
UPD.... : μPD....

Applicable Serial No.:

AEP Model: 503,301 and later

UK Model: 609,501 and later

E1 Model: 322,901 and later

E2 Model: 405,401 and later

FH-7
TC-78

MECHANISM SECTION

No.	Part No.	Description
384	3-307-483-00	BELT (R), CAPSTAN
385	3-307-486-00	SPRING, COMPRESSION
386	3-307-490-00	LEVER, FF
387	3-307-493-01	SPACER
387	3-307-493-11	SPACER
387	3-307-493-21	SPACER
387	3-307-493-31	SPACER
387	3-307-493-41	SPACER
387	3-307-493-51	SPACER
388	3-307-953-00	MAGNET, REEL TABLE
389	3-307-970-00	GEAR, FR
390	3-309-101-00	PLATE (A), ORNAMENTAL, MD
391	3-309-115-00	HOLDER, LAMP
392	3-312-403-00	GEAR (S), PINION
393	3-312-405-00	PULLEY, DRIVING
394	3-312-406-00	GEAR (T), PINION
395	3-312-408-00	GEAR (B), CONVERSION
396	3-312-409-00	BELT, DRIVING
397	3-312-412-00	GEAR (B), CAM, FWD
398	3-312-428-00	ARM (B), PUASE
399	3-312-429-00	SPRING, COMPRESSION
400	3-312-432-00	SPRING, TENSION
401	3-531-541-00	SPRING, TENSION
402	3-538-051-00	RUBBER, BRAKE
403	3-561-827-11	PLATE (A), HYSTERESIS
404	3-570-027-00	SCREW, MOTOR
405	3-570-118-00	CUSHION, MOTOR
406	3-570-914-00	SPRING, TENSION
407	3-575-392-00	RING, PISTON
408	3-578-393-00	SPRING, TENSION
409	3-644-718-00	SPRING, COMPRESSION
410	3-701-438-11	WASHER, 2.5
411	3-701-467-00	SCREW, LOCK
412	4-861-002-11	HEAT SINK
413	4-866-647-00	HEAT SINK
414	7-621-255-20	SCREW +P 2X4
415	7-621-259-35	SCREW +P 2.6X5
416	7-621-555-35	SCREW +K 2X5
417	7-621-733-08	SET-SCT, HEX 2X4 FLAT POINT
418	7-621-760-05	+PSW, 2.6X16
419	7-621-772-00	SCREW +B 2X3
420	7-621-772-40	SCREW +B 2X8
421	7-621-775-00	SCREW +B 2.6X3
422	7-624-105-04	STOP RING 2.3, TYPE -E
423	7-627-552-07	SCREW, PRECISION +P 1.7X2.5

MECHANISM SECTION

No.	Part No.	Description
424	7-671-111-11	STEEL, BOUL 1.5MM
425	7-682-546-04	SCREW +BVTT 3X5 (S)
426	7-685-104-19	SCREW +P 2X6 TYPE2 NON-SLIT
427	7-685-851-01	SCREW +BVTT 2X4 (S)
428	7-685-860-04	SCREW +BVTT 2.6X4 (S)
429	7-685-871-01	SCREW +BVTT 3X6 (S)
430	7-685-876-01	SCREW, +B 3X16 (S)
431	7-687-204-21	TOTSU PTPWH 2X6 NON-SLIT, TYPE2
432	7-687-246-21	SCREW, TOTSU PTPWH 3X8, TYPE2
433	7-687-701-39	SCREW, TOTSU BTT 2.6X4
434	A-2142-022-A	PULLEY ASSY, FR
435	X-3307-305-0	LEVER ASSY, FWD LOCK
436	X-3307-307-0	PINCH ROLLER (N) ASSY
437	X-3307-310-0	PLATE (RIGHT) ASSY, SIDE
438	X-3307-312-0	LEVER ASSY, FR
439	X-3307-316-0	PINCH ROLLER (R) ASSY
440	X-3307-317-3	PLATE ASSY, FULCRUM, LEVER
441	X-3307-319-0	ARM (A) ASSY, PAUSE
442	X-3307-321-0	HOLDER ASSY, HEAD
443	X-3307-323-0	CHASSIS (R) ASSY, HEAD
444	X-3307-326-0	PLATE (R2) ASSY, FULCRUM, EJECT
445	X-3307-327-0	PLATE (L2) ASSY, SIDE
446	X-3307-331-1	CHASSIS ASSY, MECHANISM
447	X-3307-336-2	FLYWHEEL (RS) ASSY
448	X-3307-337-2	FLYWHEEL (RT) ASSY
449	X-3307-338-0	BEARING ASSY, CAPSTAN
450	X-3307-348-0	LEVER ASSY, FF LOCK
451	X-3307-920-0	PLATE ASSY, ADJUSTMENT
452	X-3309-102-0	PLATE ASSY, ORNAMENTAL, HEAD
453	3-312-432-11	SPRING, TENSION

ELECTRICAL PARTS

Ref.No.	Part No.	Description
501	1-608-170-00	PC BOARD, HEAD TRANSLATION
502	1-608-268-00	PC BOARD, ERASE HEAD
503	1-608-391-00	PC BOARD, SYSTEM CONTROL
504	1-608-637-00	PC BOARD, KICK
505	A-2019-156-A	MOUNTED PCB, SYSTEM CONTROL
506	1-608-394-00	PC BOARD, TAPE SW
C101	1-123-354-00	ELECT 3.3MF 50V
C102	1-123-354-00	ELECT 3.3MF 50V
C103	1-123-382-00	ELECT 3.3MF 50V

NOTE:

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CAPACITORS:

- All capacitors are in μF. Common capacitors are omitted. Refer to the following lists for their part numbers.
- MF:μF, PF:μF.

RESISTORS

- All resistors are in ohms. Common 1/4W, 1/8W and 1/16W carbon resistors are omitted. Refer to the following lists for their part numbers.

- F : nonflammable

COILS

- MMH : mH, UH : μH

SEMICONDUCTORS

In each case, U : μ, for example:
UA... : μA..., UPA... : μPA..., UPC... : μPC,
UPD... : μPD...

ELECTRICAL PARTS

Ref.No.	Part No.	Description			
C104	1-123-380-00	ELECT	1MF	20%	50V
C105	1-123-356-00	ELECT	10MF	20%	16V
C106	1-161-322-00	CERAMIC	820PF	10%	50V
C107	1-161-322-00	CERAMIC	820PF	10%	50V
C108	1-123-369-00	ELECT	4.7MF	20%	25V
C109	1-107-167-00	MICA	75PF	5%	500V
C110	1-123-307-00	ELECT	100MF	20%	10V
C111	1-130-624-00	FILM	0.022MF	5%	50V
C112	1-123-354-00	ELECT	3.3MF	20%	50V
C114	1-161-316-00	CERAMIC	270PF	10%	50V
C115	1-161-377-00	CERAMIC	0.0047MF	20%	50V
C116	1-123-354-00	ELECT	3.3MF	20%	50V
C117	1-123-310-00	ELECT	470MF	20%	10V
C118	1-123-286-00	ELECT	0.33MF	20%	50V
C119	1-130-632-00	FILM	0.1MF	5%	50V
C120	1-130-627-00	FILM	0.039MF	5%	50V
C121	1-130-621-00	FILM	0.012MF	5%	50V
C122	1-123-356-00	ELECT	10MF	20%	16V
C123	1-130-629-00	FILM	0.056MF	5%	50V
C124	1-130-628-00	FILM	0.047MF	5%	50V
C125	1-130-624-00	FILM	0.022MF	5%	50V
C126	1-108-575-00	MYLAR	0.0068MF	5%	50V
C127	1-123-369-00	ELECT	4.7MF	20%	50V
C128	1-123-369-00	ELECT	4.7MF	20%	50V
C129	1-123-380-00	ELECT	1MF	20%	50V
C130	1-123-354-00	ELECT	3.3MF	20%	50V
C131	1-123-356-00	ELECT	10MF	20%	16V
C132	1-130-626-00	FILM	0.033MF	5%	50V
C133	1-130-621-00	FILM	0.012MF	5%	50V
C134	1-108-565-00	MYLAR	0.0027MF	5%	50V
C135	1-108-563-00	MYLAR	0.0022MF	5%	50V
C136	1-130-627-00	FILM	0.039MF	5%	50V
C137	1-130-627-00	FILM	0.039MF	5%	50V
C138	1-108-555-00	MYLAR	0.001MF	5%	50V
C139	1-130-627-00	FILM	0.039MF	5%	50V
C140	1-108-571-00	MYLAR	0.0047MF	5%	50V
C141	1-107-167-00	MICA	75PF	5%	500V
C143	1-123-319-00	ELECT	47MF	20%	16V
C209	1-107-167-00	MICA	75PF	5%	500V
C211	1-130-624-00	FILM	0.022MF	5%	50V
C219	1-130-632-00	FILM	0.1MF	5%	50V
C220	1-130-627-00	FILM	0.039MF	5%	50V
C221	1-130-621-00	FILM	0.012MF	5%	50V
C223	1-130-629-00	FILM	0.056MF	5%	50V
C224	1-130-628-00	FILM	0.047MF	5%	50V

ELECTRICAL PARTS

Ref.No.	Part No.	Description			
C225	1-130-624-00	FILM	0.022MF	5%	50V
C232	1-130-626-00	FILM	0.033MF	5%	50V
C233	1-130-621-00	FILM	0.012MF	5%	50V
C236	1-130-627-00	FILM	0.039MF	5%	50V
C237	1-130-627-00	FILM	0.039MF	5%	50V
C239	1-130-627-00	FILM	0.039MF	5%	50V
C241	1-107-167-00	MICA	75PF	5%	500V
C301	1-123-332-00	ELECT	47MF	20%	25V
C302	1-123-294-00	ELECT	47MF	20%	6.3V
C303	1-123-323-00	ELECT	470MF	20%	16V
C304	1-123-380-00	ELECT	1MF	20%	50V
C305	1-131-371-00	TANTALUM	10MF	20%	16V
C306	1-123-328-00	ELECT	4.7MF	20%	25V
C307	1-161-377-00	CERAMIC	0.0047MF	20%	50V
C308	1-161-259-00	CERAMIC	10PF	5%	50V
C309	1-123-356-00	ELECT	10MF	20%	16V
C310	1-123-380-00	ELECT	1MF	20%	50V
C311	1-123-382-00	ELECT	3.3MF	20%	50V
C312	1-123-354-00	ELECT	3.3MF	20%	50V
C314	1-123-379-00	ELECT	0.47MF	20%	50V
C315	1-124-089-00	ELECT	2.2MF	20%	50V
C316	1-130-291-00	FILM	0.0056MF	5%	100V
C317	1-130-291-00	FILM	0.0056MF	5%	100V
C318	1-130-293-00	FILM	0.0068MF	5%	100V
C319	1-123-379-00	ELECT	0.47MF	20%	50V
C320	1-123-380-00	ELECT	1MF	20%	50V
C321	1-129-714-00	FILM	0.01MF	5%	630V
C322	1-129-928-00	MYLAR	0.0027MF	99%	630V
C323	1-129-898-00	FILM	0.0022MF	5%	630V
C324	1-123-308-00	ELECT	220MF	20%	10V
C325	1-101-880-00	CERAMIC	47PF	5%	50V
C402	1-123-328-00	ELECT	4.7MF	20%	25V
C403	1-108-571-00	MYLAR	0.0047MF	5%	50V
C412	1-123-354-00	ELECT	3.3MF	20%	50V
C413	1-123-380-00	ELECT	1MF	20%	50V
C414	1-123-323-00	ELECT	470MF	20%	16V
C415	1-123-298-00	ELECT	470MF	20%	6.3V
C417	1-161-328-00	CERAMIC	0.0047MF	30%	50V
CNJ101	1-562-068-00	SOCKET, CONNECTOR 13P			
▲CNJ102	1-560-060-00	PIN, CONNECTOR 2P			
▲CNJ103	1-560-061-00	PIN, CONNECTOR 3P			
▲CNJ104	1-560-063-00	PIN, CONNECTOR 5P			
▲CNJ105	1-560-064-00	PIN, CONNECTOR 6P			
▲CNJ106	1-560-338-00	PIN, CONNECTOR 7P			
▲CNJ107	1-560-064-00	PIN, CONNECTOR 6P			

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SEMICONDUCTORS

- In each case, U : μ , for example:
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UPD... : μ PD...

Applicable Serial No.:

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UK Model: 609,501 and later

E1 Model: 322,901 and later

E2 Model: 405,401 and later

FH-7
TC-78

ELECTRICAL PARTS

Ref.No.	Part No.	Description
CT101	1-141-225-00	CAP, TUNING, TRIMMER
CT201	1-141-225-00	CAP, TUNING, TRIMMER
D101	8-719-815-55	DIODE 1S1555
D102	8-719-815-55	DIODE 1S1555
D103	8-719-815-55	DIODE 1S1555
D201	8-719-815-55	DIODE 1S1555
D202	8-719-815-55	DIODE 1S1555
D203	8-719-815-55	DIODE 1S1555
D301	8-719-815-55	DIODE 1S1555
D302	8-719-815-55	DIODE 1S1555
D303	8-719-815-55	DIODE 1S1555
D304	8-719-815-55	DIODE 1S1555
D305	8-719-815-55	DIODE 1S1555
D306	8-719-815-55	DIODE 1S1555
D307	8-719-902-77	DIODE SLR-34PC5
D308	8-719-902-77	DIODE SLR-34PC5
D309	8-719-902-77	DIODE SLR-34PC5
D310	8-719-902-77	DIODE SLR-34PC5
D311	8-719-910-64	DIODE HZ6B1L
D312	8-719-200-02	DIODE 10E-2
D313	8-719-200-02	DIODE 10E-2
D402	8-719-815-55	DIODE 1S1555
D403	8-719-815-55	DIODE 1S1555
D404	8-719-902-78	DIODE SLR-34DC5
D405	8-719-934-05	DIODE SLR-34URC5
D406	8-719-902-51	DIODE SLP251B
D407	8-719-902-51	DIODE SLP251B
D408	8-719-902-51	DIODE SLP251B
D409	8-719-902-51	DIODE SLP251B
D410	8-719-902-51	DIODE SLP251B
D411	8-719-815-55	DIODE 1S1555
D412	8-719-815-55	DIODE 1S1555
D414	8-719-815-55	DIODE 1S1555
D416	8-719-815-55	DIODE 1S1555
D581	8-719-815-55	DIODE 1S1555
D582	8-719-815-55	DIODE 1S1555
HE	8-825-535-20	HEAD, ERASE (ES237-36)
HRP	8-825-548-10	HEAD, R/P (PA242-3602)
IC101	8-759-300-74	IC CX-174A
IC201	8-759-300-74	IC CX-174A
IC301	8-759-932-80	IC BA328
IC302	8-759-800-32	IC LB1403
IC303	8-759-700-08	IC NJM4558S
IC401	8-759-201-38	IC TC9310N-013
IC402	8-759-700-11	IC NJM78M05A

ELECTRICAL PARTS

Ref.No.	Part No.	Description
L101	1-408-255-00	MICRO INDUCTOR 6.8MMH
L102	1-408-260-00	MICRO INDUCTOR 18MMH
L103	1-408-262-00	MICRO INDUCTOR 27MMH
L201	1-408-255-00	MICRO INDUCTOR 6.8MMH
L202	1-408-260-00	MICRO INDUCTOR 18MMH
L203	1-408-262-00	MICRO INDUCTOR 27MMH
L301	1-407-173-XX	MICRO INDUCTOR 220UH
M1	X-3307-322-2	MOTOR (R) ASSY
PL1	1-518-512-11	LAMP, PILOT
PL2	1-518-512-21	LAMP, PILOT
PM1	1-454-316-00	SOLENOID, PLUNGER
PM2	1-454-316-00	SOLENOID, PLUNGER
Q101	8-729-334-58	TRANSISTOR 2SC1345
Q102	8-729-178-54	TRANSISTOR 2SC2785
Q103	8-729-100-13	TRANSISTOR 2SC2001
Q104	8-729-178-54	TRANSISTOR 2SC2785
Q105	8-729-178-54	TRANSISTOR 2SC2785
Q106	8-729-178-54	TRANSISTOR 2SC2785
Q107	8-729-178-54	TRANSISTOR 2SC2785
Q108	8-729-178-54	TRANSISTOR 2SC2785
Q109	8-729-178-54	TRANSISTOR 2SC2785
Q201	8-729-334-58	TRANSISTOR 2SC1345
Q202	8-729-178-54	TRANSISTOR 2SC2785
Q203	8-729-100-13	TRANSISTOR 2SC2001
Q204	8-729-178-54	TRANSISTOR 2SC2785
Q205	8-729-178-54	TRANSISTOR 2SC2785
Q206	8-729-178-54	TRANSISTOR 2SC2785
Q207	8-729-178-54	TRANSISTOR 2SC2785
Q208	8-729-178-54	TRANSISTOR 2SC2785
Q209	8-729-178-54	TRANSISTOR 2SC2785
Q301	8-759-101-13	IC UPA74V-FA
Q302	8-759-101-13	IC UPA74V-FA
Q303	8-729-178-54	TRANSISTOR 2SC2785
Q304	8-729-178-54	TRANSISTOR 2SC2785
Q305	8-729-178-54	TRANSISTOR 2SC2785
Q306	8-729-178-54	TRANSISTOR 2SC2785
Q307	8-729-201-52	TRANSISTOR 2SA1015
Q309	8-729-178-54	TRANSISTOR 2SC2785
Q310	8-729-178-54	TRANSISTOR 2SC2785
Q311	8-729-201-52	TRANSISTOR 2SA1015
Q312	8-729-178-54	TRANSISTOR 2SC2785
Q313	8-729-663-47	TRANSISTOR 2SC1364
Q314	8-729-663-47	TRANSISTOR 2SC1364
Q315	8-729-178-54	TRANSISTOR 2SC2785
Q316	8-729-201-52	TRANSISTOR 2SA1015

NOTE:

- Items with no part number and no description are not stocked because they are seldom required for routine service.
- Items marked "▲" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- Due to standardization, parts with part numbers (Δ-ΔΔΔ-ΔΔΔ-XX or Δ-ΔΔΔ-ΔΔΔ-X) may be different from those used in the set.

CAPACITORS:

- All capacitors are in μF. Common capacitors are omitted. Refer to the following lists for their part numbers.
- MF:μF, PF:μμF.

RESISTORS

- All resistors are in ohms. Common 1/4W, 1/8W and 1/16W carbon resistors are omitted. Refer to the following lists for their part numbers.
- F: nonflammable

COILS

- MMH: mH, UH: μH

SEMICONDUCTORS

- In each case, U: μ, for example:
UA...: μA..., UPA...: μPA..., UPC...: μPC,
UPD...: μPD...

ELECTRICAL PARTS

Ref.No.	Part No.	Description
Q317	8-729-178-54	TRANSISTOR 2SC2785
Q318	8-729-180-92	TRANSISTOR 2SD809-K
Q319	8-729-178-54	TRANSISTOR 2SC2785
Q320	8-729-178-54	TRANSISTOR 2SC2785
Q321	8-729-178-54	TRANSISTOR 2SC2785
Q322	8-729-178-54	TRANSISTOR 2SC2785
Q401	8-729-117-54	TRANSISTOR 2SA1175
Q402	8-719-902-01	PHOTO INTERRUPTOR SPI201-20
Q403	8-729-663-47	TRANSISTOR 2SC1364
Q404	8-729-663-47	TRANSISTOR 2SC1364
Q405	8-729-663-47	TRANSISTOR 2SC1364
Q406	8-729-663-47	TRANSISTOR 2SC1364
Q408	8-729-663-47	TRANSISTOR 2SC1364
Q410	8-729-117-54	TRANSISTOR 2SA1175
Q411	8-729-663-47	TRANSISTOR 2SC1364
Q412	8-729-117-54	TRANSISTOR 2SA1175
Q413	8-729-180-92	TRANSISTOR 2SD809-K
Q581	8-729-612-77	TRANSISTOR 2SA1027R
R101	1-246-473-00	CARBON 1K 5% 1/4W
R102	1-246-521-00	CARBON 100K 5% 1/4W
R103	1-246-521-00	CARBON 100K 5% 1/4W
R104	1-246-523-00	CARBON 120K 5% 1/4W
R105	1-246-481-00	CARBON 2.2K 5% 1/4W
R106	1-246-511-00	CARBON 39K 5% 1/4W
R107	1-246-483-00	CARBON 2.7K 5% 1/4W
R108	1-246-455-00	CARBON 180 5% 1/4W
R109	1-246-521-00	CARBON 100K 5% 1/4W
R110	1-246-521-00	CARBON 100K 5% 1/4W
R111	1-246-521-00	CARBON 100K 5% 1/4W
R112	1-246-525-00	CARBON 150K 5% 1/4W
R113	1-246-473-00	CARBON 1K 5% 1/4W
R115	1-246-800-00	CARBON 27K 5% 1/8W
R116	1-246-507-00	CARBON 27K 5% 1/4W
R117	1-246-449-00	CARBON 100 5% 1/4W
R118	1-246-524-00	CARBON 130K 5% 1/4W
R119	1-246-490-00	CARBON 5.1K 5% 1/4W
R121	1-246-501-00	CARBON 15K 5% 1/4W
R122	1-246-503-00	CARBON 18K 5% 1/4W
R123	1-246-529-00	CARBON 220K 5% 1/4W
R124	1-246-787-00	CARBON 2.2K 5% 1/8W
R125	1-246-497-00	CARBON 10K 5% 1/4W
R126	1-246-497-00	CARBON 10K 5% 1/4W
R127	1-246-513-00	CARBON 47K 5% 1/4W
R128	1-246-513-00	CARBON 47K 5% 1/4W
R129	1-246-533-00	CARBON 330K 5% 1/4W

ELECTRICAL PARTS

Ref.No.	Part No.	Description			
R130	1-246-530-00	CARBON	240K	5%	1/4W
R131	1-246-530-00	CARBON	240K	5%	1/4W
R132	1-246-499-00	CARBON	12K	5%	1/4W
R133	1-246-492-00	CARBON	6.2K	5%	1/4W
R134	1-246-449-00	CARBON	100	5%	1/4W
R135	1-246-455-00	CARBON	180	5%	1/4W
R136	1-246-463-00	CARBON	390	5%	1/4W
R137	1-246-475-00	CARBON	1.2K	5%	1/4W
R138	1-246-501-00	CARBON	15K	5%	1/4W
R139	1-246-509-00	CARBON	33K	5%	1/4W
R140	1-246-538-00	CARBON	510K	5%	1/4W
R141	1-246-513-00	CARBON	47K	5%	1/4W
R142	1-246-481-00	CARBON	2.2K	5%	1/4W
R143	1-246-497-00	CARBON	10K	5%	1/4W
R144	1-246-501-00	CARBON	15K	5%	1/4W
R145	1-246-473-00	CARBON	1K	5%	1/4W
R146	1-246-489-00	CARBON	4.7K	5%	1/4W
R147	1-246-473-00	CARBON	1K	5%	1/4W
R148	1-246-521-00	CARBON	100K	5%	1/4W
R149	1-246-523-00	CARBON	120K	5%	1/4W
R150	1-246-523-00	CARBON	120K	5%	1/4W
R151	1-246-771-00	CARBON	100	5%	1/8W
R152	1-246-788-00	CARBON	2.7K	5%	1/8W
R153	1-246-782-00	CARBON	820	5%	1/8W
R154	1-246-797-00	CARBON	15K	5%	1/8W
R155	1-246-505-00	CARBON	22K	5%	1/4W
R156	1-246-779-00	CARBON	470	5%	1/8W
R157	1-246-853-89	CARBON	6.2K	5%	1/8W
R158	1-247-851-00	CARBON	6.8K	5%	1/6W
R159	1-246-505-00	CARBON	22K	5%	1/4W
R160	1-246-787-00	CARBON	2.2K	5%	1/8W
R161	1-246-784-00	CARBON	1.2K	5%	1/8W
R162	1-246-505-00	CARBON	22K	5%	1/4W
R163	1-246-791-00	CARBON	4.7K	5%	1/8W
R164	1-246-796-00	CARBON	12K	5%	1/8W
R165	1-246-791-00	CARBON	4.7K	5%	1/8W
R166	1-246-505-00	CARBON	22K	5%	1/4W
R167	1-246-799-00	CARBON	22K	5%	1/8W
R301	1-246-491-00	CARBON	5.6K	5%	1/4W
R302	1-246-497-00	CARBON	10K	5%	1/4W
R303	1-246-493-00	CARBON	6.8K	5%	1/4W
R304	1-246-485-00	CARBON	3.3K	5%	1/4W
R305	1-246-491-00	CARBON	5.6K	5%	1/4W
R306	1-246-489-00	CARBON	4.7K	5%	1/4W
R307	1-247-863-00	CARBON	22K	5%	1/6W

NOTE:

- Items with no part number and no description are not stocked because they are seldom required for routine service.
- Items marked "▲" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- Due to standardization, parts with part numbers (Δ-ΔΔΔ-ΔΔΔ-XX or Δ-ΔΔΔΔ-ΔΔΔ-X) may be different from those used in the set.

CAPACITORS:

- All capacitors are in μF. Common capacitors are omitted. Refer to the following lists for their part numbers.
MF:μF, PF:μμF.

RESISTORS

- All resistors are in ohms. Common 1/4W, 1/8W and 1/16W carbon resistors are omitted. Refer to the following lists for their part numbers.

- F : nonflammable

COILS

- MMH : mH, UH : μH

SEMICONDUCTORS

- In each case, U : μ, for example:
UA...: μA..., UPA...: μPA..., UPC...: μPC,
UPD...: μPD...

Applicable Serial No.:

AEP Model: 503,301 and later

UK Model: 609,501 and later

E1 Model: 322,901 and later

E2 Model: 405,401 and later

**FH-7
TC-78**ELECTRICAL PARTS

Ref.No.	Part No.	Description			
R308	1-246-505-00	CARBON	22K	5%	1/4W
R309	1-246-470-00	CARBON	750	5%	1/4W
R310	1-246-799-00	CARBON	22K	5%	1/8W
R311	1-246-809-00	CARBON	150K	5%	1/8W
R312	1-246-806-00	CARBON	82K	5%	1/8W
R313	1-246-779-00	CARBON	470	5%	1/8W
R314	1-246-811-00	CARBON	220K	5%	1/8W
R315	1-246-811-00	CARBON	220K	5%	1/8W
R316	1-246-781-00	CARBON	680	5%	1/8W
R317	1-246-791-00	CARBON	4.7K	5%	1/8W
R318	1-246-799-00	CARBON	22K	5%	1/8W
R319	1-247-046-00	CARBON	270K	5%	1/8W
R320	1-246-783-00	CARBON	1K	5%	1/8W
R321	1-246-799-00	CARBON	22K	5%	1/8W
R322	1-246-799-00	CARBON	22K	5%	1/8W
R323	1-246-799-00	CARBON	22K	5%	1/8W
R325	1-246-796-00	CARBON	12K	5%	1/8W
R326	1-246-792-00	CARBON	5.6K	5%	1/8W
R327	1-246-791-00	CARBON	4.7K	5%	1/8W
R328	1-246-811-00	CARBON	220K	5%	1/8W
R329	1-246-799-00	CARBON	22K	5%	1/8W
R330	1-246-799-00	CARBON	22K	5%	1/8W
R331	1-246-795-00	CARBON	10K	5%	1/8W
R332	1-246-497-00	CARBON	10K	5%	1/4W
R333	1-246-497-00	CARBON	10K	5%	1/4W
R334	1-246-795-00	CARBON	10K	5%	1/8W
R335	1-246-803-00	CARBON	47K	5%	1/8W
R336	1-246-791-00	CARBON	4.7K	5%	1/8W
R337	1-246-795-00	CARBON	10K	5%	1/8W
R338	1-246-799-00	CARBON	22K	5%	1/8W
R339	1-246-799-00	CARBON	22K	5%	1/8W
R340	1-246-464-00	CARBON	430	5%	1/4W
R341	1-246-481-00	CARBON	2.2K	5%	1/4W
R342	1-246-477-00	CARBON	1.5K	5%	1/4W
R343	1-246-482-00	CARBON	2.4K	5%	1/4W
R344	1-246-799-00	CARBON	22K	5%	1/8W
R345	1-246-799-00	CARBON	22K	5%	1/8W
R346	1-246-799-00	CARBON	22K	5%	1/8W
R347	1-246-505-00	CARBON	22K	5%	1/4W
R348	1-246-465-00	CARBON	470	5%	1/4W
R351	1-246-427-00	CARBON	12	5%	1/4W
R352	1-246-493-00	CARBON	6.8K	5%	1/4W
R401	1-247-863-00	CARBON	22K	5%	1/6W
R402	1-247-887-00	CARBON	220K	5%	1/6W
R405	1-246-481-00	CARBON	2.2K	5%	1/4W

ELECTRICAL PARTS

R406	1-246-481-00	CARBON	2.2K	5%	1/4W
R409	1-246-505-00	CARBON	22K	5%	1/4W
R410	1-246-505-00	CARBON	22K	5%	1/4W
R411	1-246-529-00	CARBON	220K	5%	1/4W
R412	1-246-505-00	CARBON	22K	5%	1/4W
R413	1-246-489-00	CARBON	4.7K	5%	1/4W
R414	1-246-461-00	CARBON	330	5%	1/4W
R415	1-247-863-00	CARBON	22K	5%	1/6W
R416	1-247-867-00	CARBON	33K	5%	1/6W
R417	1-246-465-00	CARBON	470	5%	1/4W
R418	1-246-461-00	CARBON	330	5%	1/4W
R419	1-246-491-00	CARBON	5.6K	5%	1/4W
R420	1-246-491-00	CARBON	5.6K	5%	1/4W
R421	1-246-509-00	CARBON	33K	5%	1/4W
R422	1-246-514-00	CARBON	51K	5%	1/4W
R423	1-246-505-00	CARBON	22K	5%	1/4W
R424	1-246-521-00	CARBON	100K	5%	1/4W
R425	1-247-855-00	CARBON	10K	5%	1/6W
R426	1-247-825-00	CARBON	560	5%	1/6W
R428	1-246-433-00	CARBON	22	5%	1/4W
R429	1-206-477-00	METAL OXIDE	39	5%	2W
R518	1-247-839-00	CARBON	2.2K	5%	1/6W
RV101	1-226-236-00	RES, ADJ, CARBON	10K		
RV102	1-226-238-00	RES, ADJ, CARBON	50K		
RV201	1-226-236-00	RES, ADJ, CARBON	10K		
RV202	1-226-238-00	RES, ADJ, CARBON	50K		
RV301	1-226-239-00	RES, ADJ, CARBON	100K		
RY301	1-515-473-00	RELAY			
S101	1-552-412-00	SWITCH, KEY BOARD, REC MUTE			
S102	1-552-412-00	SWITCH, KEY BOARD, REC			
S103	1-552-412-00	SWITCH, KEY BOARD, PAUSE			
S104	1-552-412-00	SWITCH, KEY BOARD, FF			
S105	1-552-412-00	SWITCH, KEY BOARD, FWD			
S106	1-552-412-00	SWITCH, KEY BOARD, STOP			
S107	1-552-412-00	SWITCH, KEY BOARD, REVERSE			
S108	1-552-412-00	SWITCH, KEY BOARD, FAST REVERSE			
S109	1-554-205-00	SWITCH, SLIDE, CASSETTE LOADING			
S110	1-554-205-00	SWITCH, SLIDE, ERASE PROOF			
S111	1-554-205-00	SWITCH, SLIDE, TAPE SELECT			
S112	1-554-205-00	SWITCH, SLIDE, TAPE SELECT			
S201	1-554-118-00	SWITCH, PUSH, DOLBY NR			
S202	1-552-334-00	SWITCH, BAND CHANGER, TAPE SELECTOR			
S203	1-554-277-00	SWITCH, SLIDE, ISS			
T301	1-433-259-00	TRANSFORMER, BIAS OSCILLATOR			

NOTE:

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- Items marked "▲" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- Due to standardization, parts with part numbers (Δ-ΔΔΔ-ΔΔΔ-XX or Δ-ΔΔΔΔ-ΔΔΔ-X) may be different from those used in the set.

CAPACITORS:

- All capacitors are in μF . Common capacitors are omitted. Refer to the following lists for their part numbers.
- MF: μF , PF: μF .

RESISTORS

- All resistors are in ohms. Common 1/4W, 1/8W and 1/16W carbon resistors are omitted. Refer to the following lists for their part numbers.

- F : nonflammable

COILS

- MMH : mH, UH : μH

The components identified by shading and mark ▲ are critical for safety. Replace only with part number specified.

SEMICONDUCTORS

In each case, U : μ , for example:
 UA... : μA ..., UPA... : μPA ..., UPC... : μPC ,
 UPD... : μPD ...

STEREO CASSETTE DECK (TC-78)

FH-7 TC-78

*AEP Model
UK Model
E Model*

SUPPLEMENT

File this supplement with the service manual.

No. 3
April, 1983

Subject: SYSTEM CONTROL CIRCUIT CHANGE


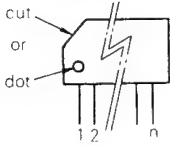
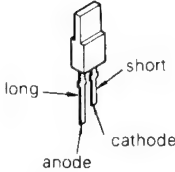
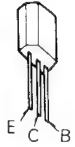
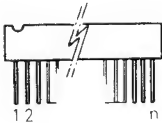
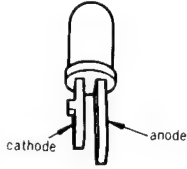
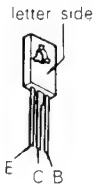
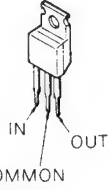
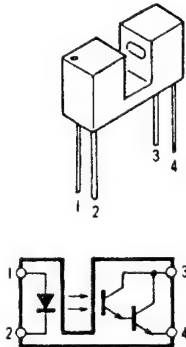
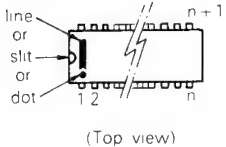
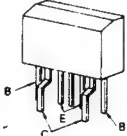
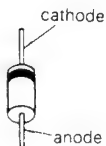
- System control circuit and IC401 have been changed.
- Because of this change, three types of system control ICs (IC401) have been existed. Be careful to marking of IC401 in repairing.
- Use TC9310N-001 for replacing TC9310N-001.
Use TC9310N-024 for replacing TC9310N-013 or TC9310N-024.

• CHANGED PARTS

Ref. No.	Former Parts	New Parts		Remarks
	Description	Part No.	Description	
D403	.....	8-719-815-55	DIODE 1S1555	ADDED
D581	DIODE 1S1555	.....		DELETED
D582	DIODE 1S1555	.....		DELETED
IC401	IC TC9310N-013	8-759-201-52	IC TC9310N-024	
Q581	TRANSISTOR 2SA1027R	.....		DELETED
R581	CARBON 2.2K 5% 1/6W	.....		DELETED

SONY
SERVICE MANUAL

SEMICONDUCTOR LEAD LAYOUTS

<p>2SA1015 2SC1345 2SC1364 2SC2001</p> 	<p>LB1403 NJM4558S</p> 	<p>SLP251B</p> 
<p>2SA1175 2SC2785</p> 	<p>BA328</p> 	<p>SLR34DC5 SLR34PC5 SLR34URC5</p> 
<p>2SD809</p> 	<p>NJM78M05A</p> 	<p>SP1201</p> 
<p>CX174A MB84069UB TC9310N-024 μPD4011C</p>  <p>(Top view)</p>	<p>μPA74V-FA</p> 	<p>10E2 1S1555 HZ6B1L</p> 

Applicable Serial No.:
AEP Model: 503,301 and later
UK Model: 609,501 and later

E1 Model: 322,901 and later
E2 Model: 405,401 and later

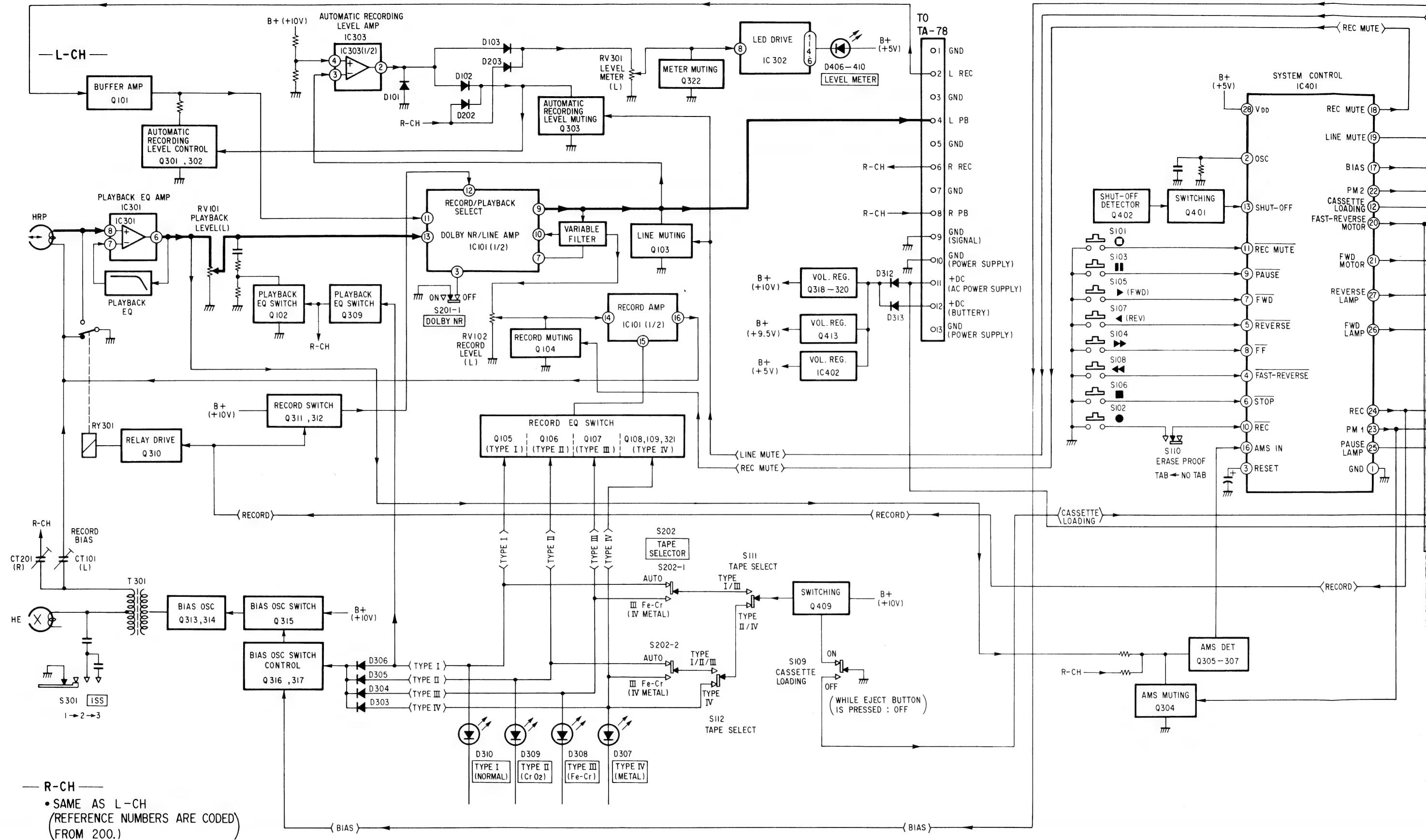
FH-7
TC-78

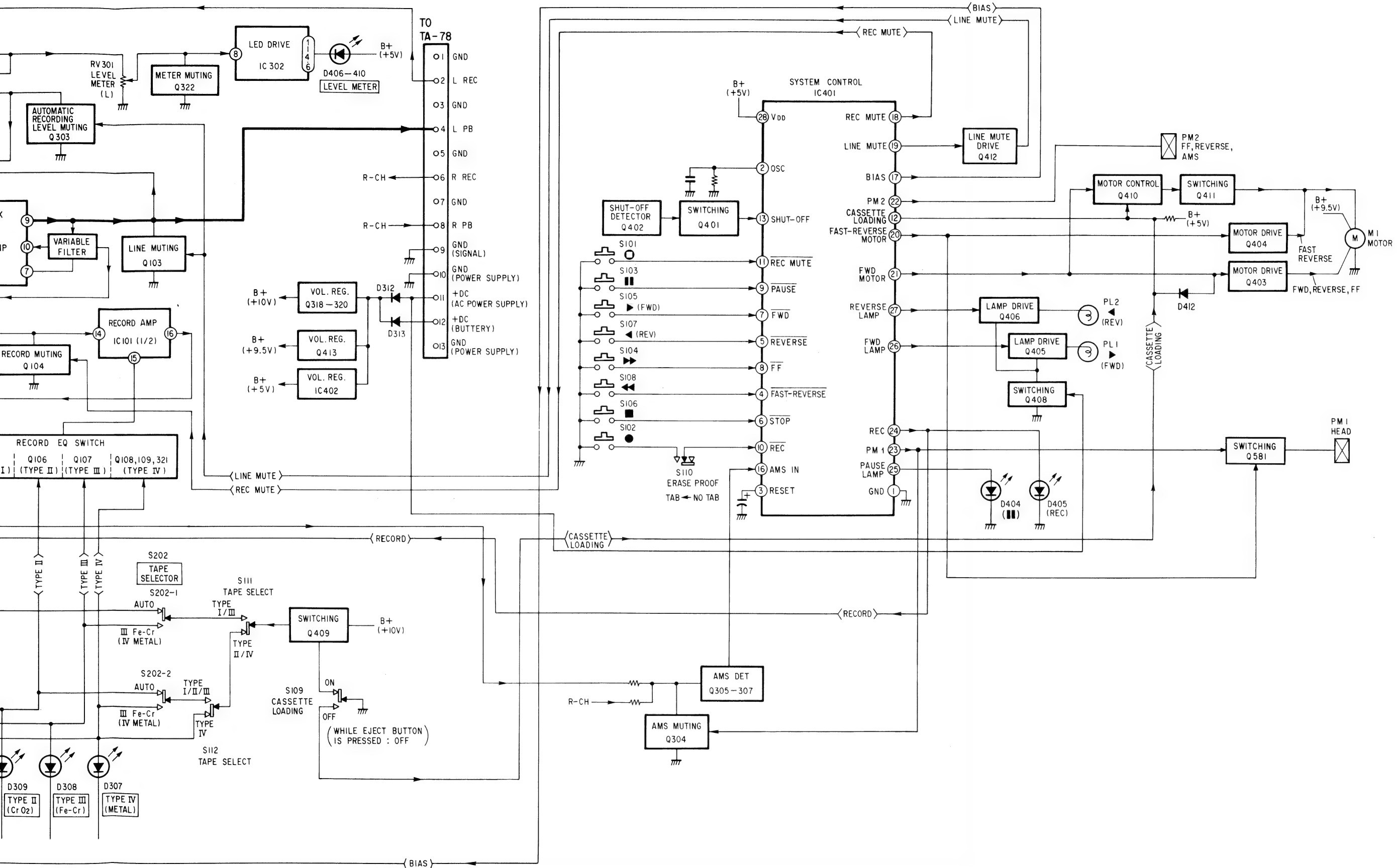
FH-7
TC-78

Applicable Serial No.:
AEP Model: 503,301 and later
UK Model: 609,501 and later

E1 Model: 322,901 and later
E2 Model: 405,401 and later

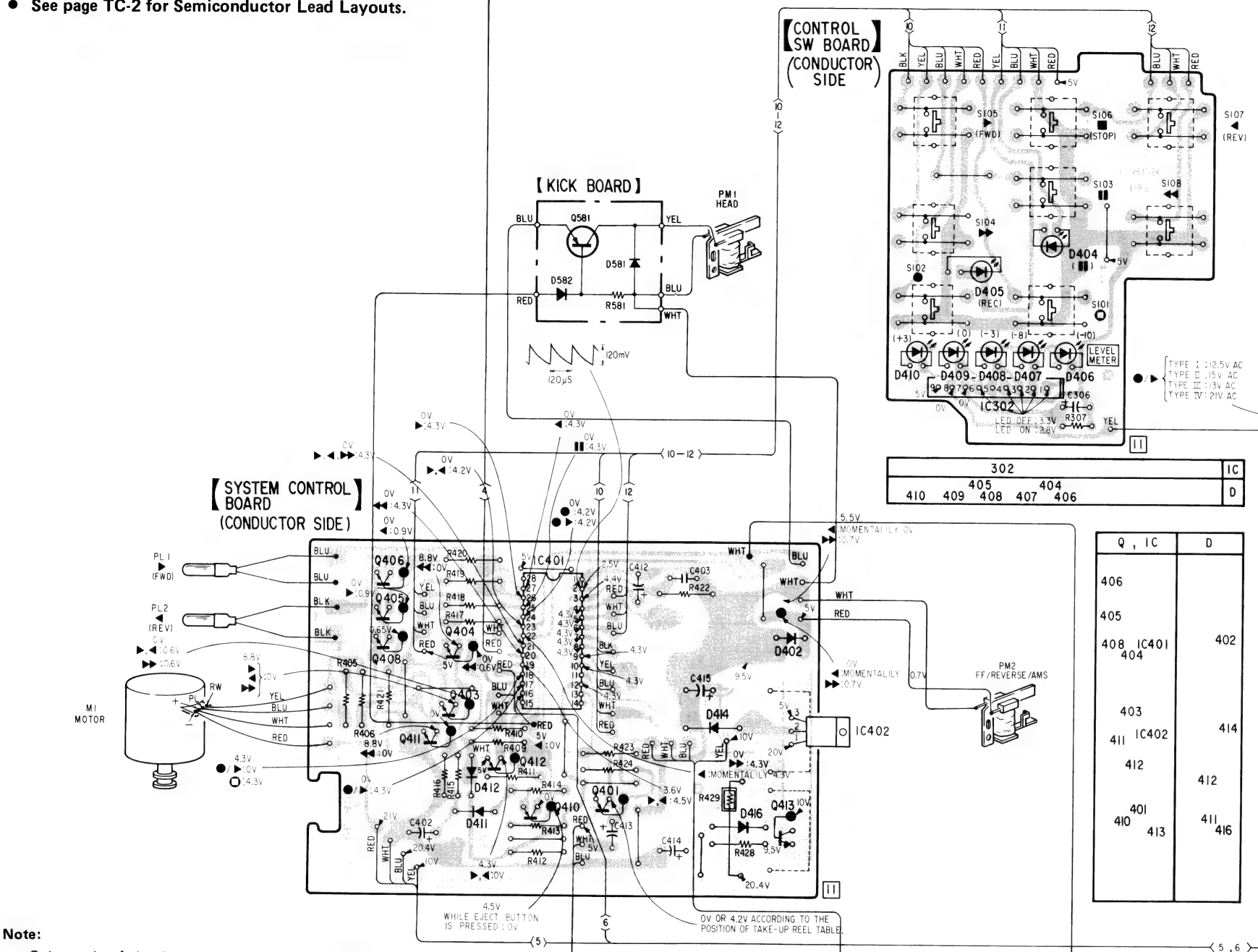
BLOCK DIAGRAM



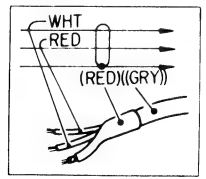


MOUNTING DIAGRAM

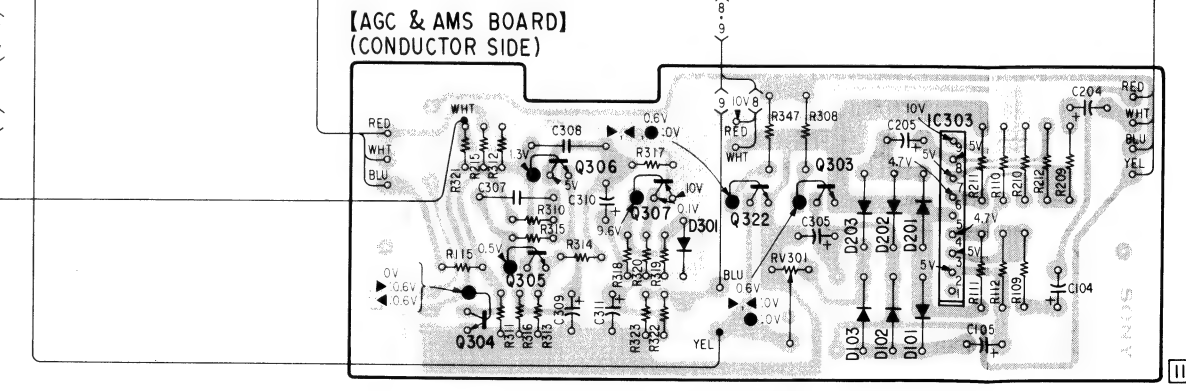
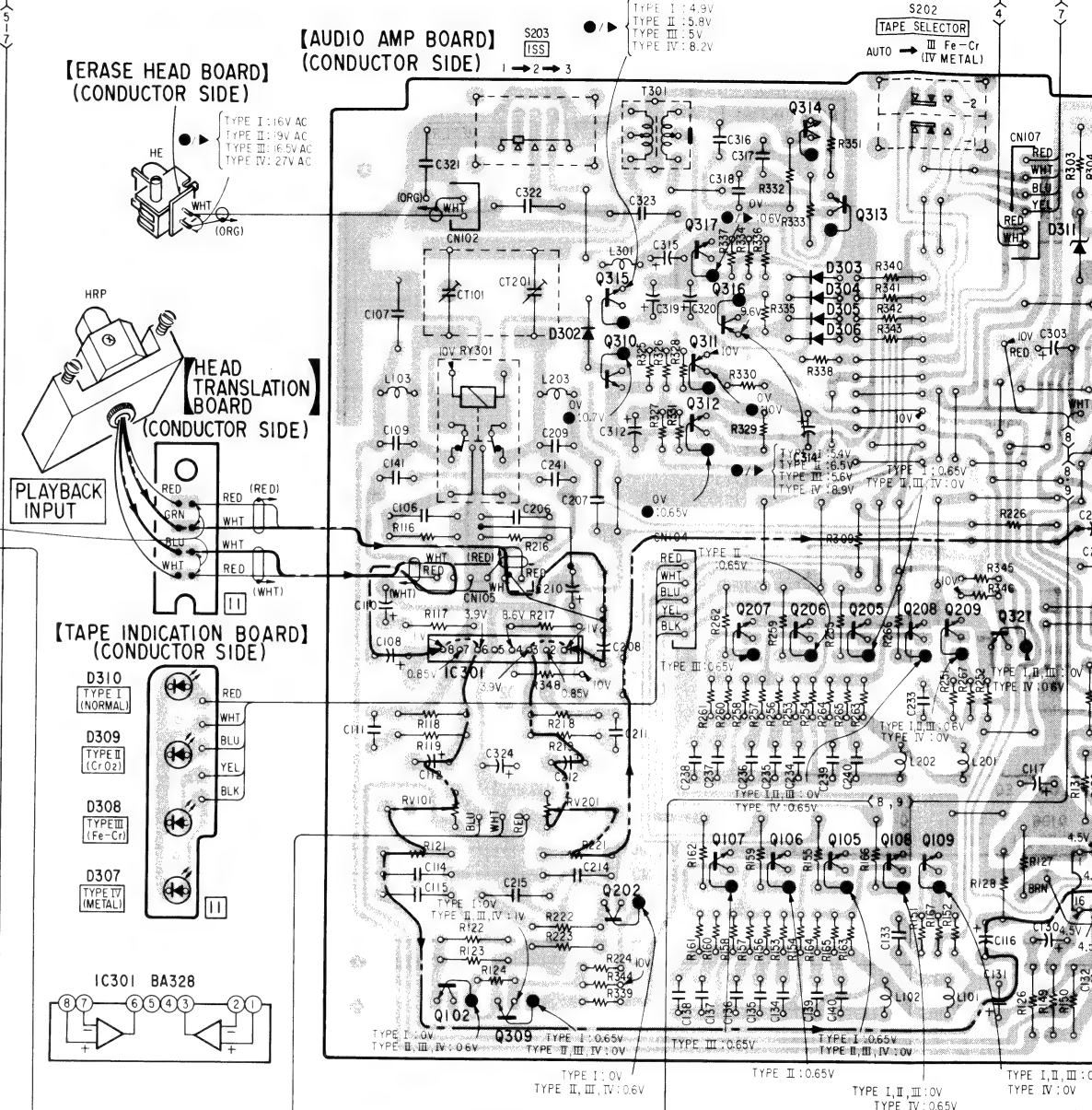
See page TC-2 for Semiconductor Lead Layouts.



Note:
Color code of sleeving over the end of the jacket.



- : parts extracted from the component side.
- : parts extracted from the conductor side.
- : part mounted on the conductor side.
- : B + pattern
- : signal path
- : L-CH signal path
- : R-CH signal path



Q	IC	306	307	322	303	IC303
D		304	305	301	203,202,201	103,102,101

Applicable Serial No.:
AEP Model: 503,301 and later
UK Model: 609,501 and later

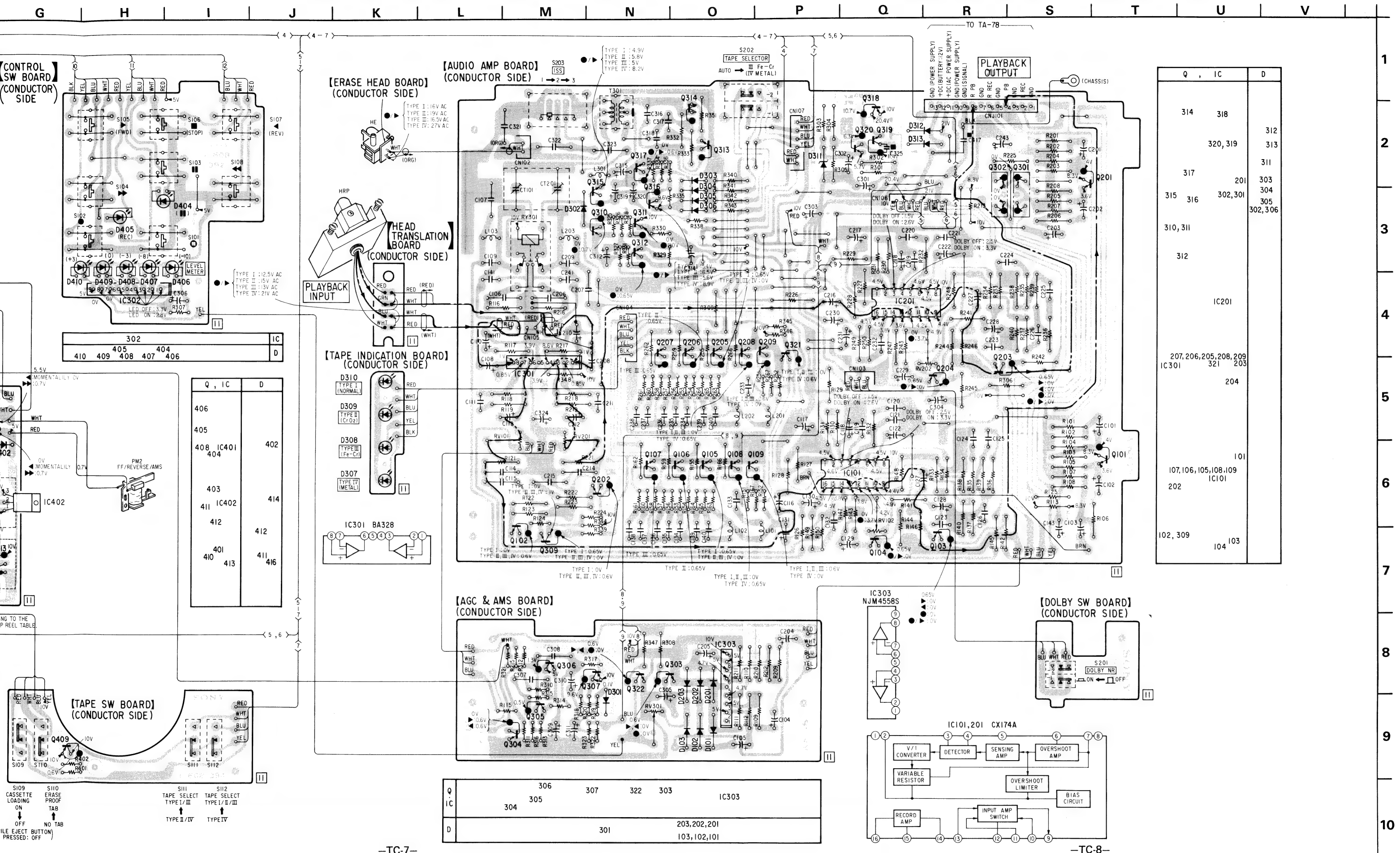
E1 Model: 322,901 and later
E2 Model: 405,401 and later

FH-7
TC-78

FH-7
TC-78

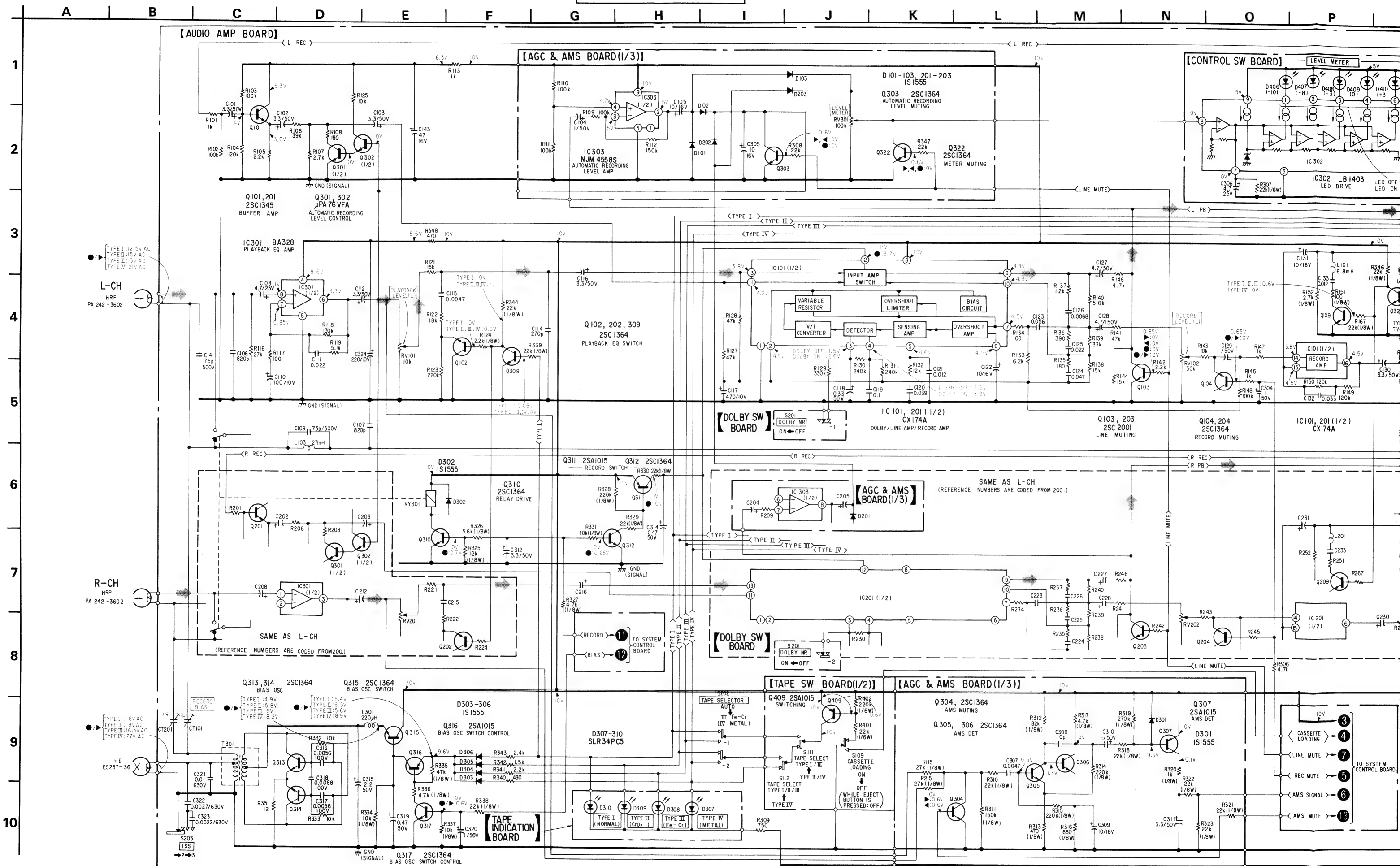
Applicable Serial No.:
AEP Model: 503,301 and later
UK Model: 609,501 and later

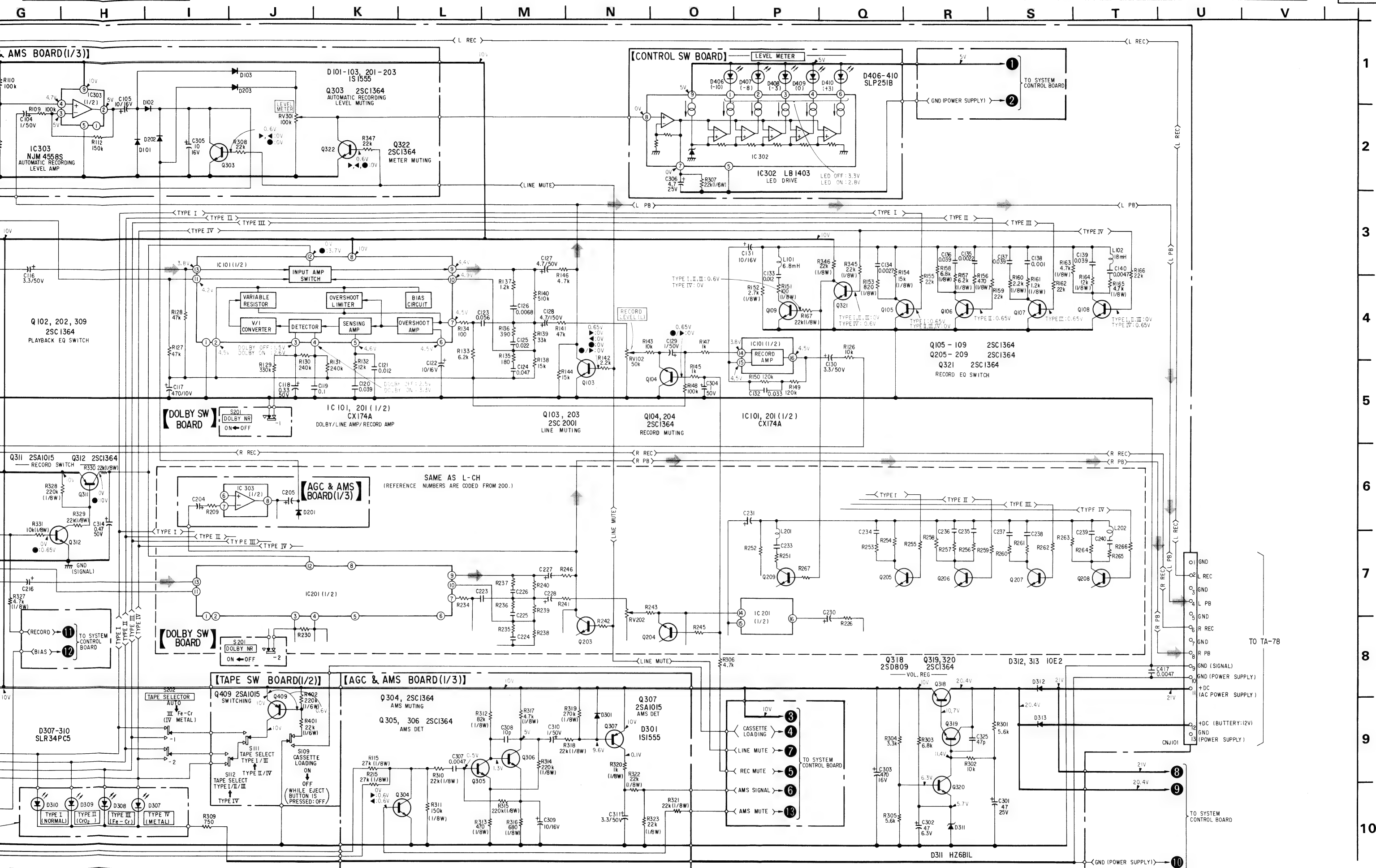
E1 Model: 322,901 and later
E2 Model: 405,401 and later



- See page TC-14 for Notes.

FH-7
TC-78





SERVICE MANUAL

SUPPLEMENT

File this supplement with the service manual.

Subject: System control board change

TC-78C:

US Model
Canadian Model

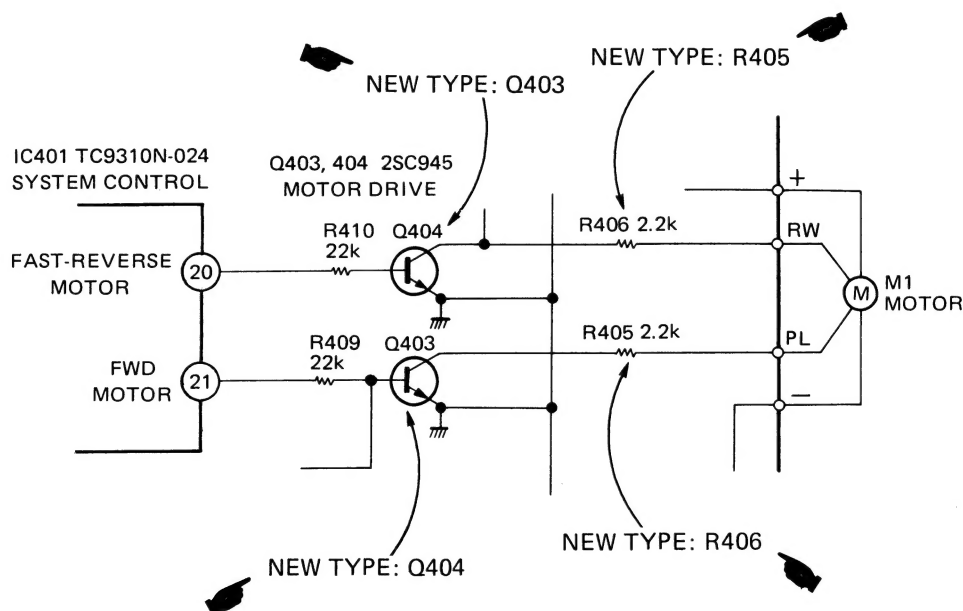
TC-78:

AEP Model
UK Model
E Model

No. 4

December, 1983

Because of system control board change, the new mounting diagram has been issued. As to the schematic diagram, refer to the service manual (Supplement No. 3) using TC9310N-024 for system control IC. Besides, be careful of the difference of reference numbers (Q403, Q404, R405, R406) between the former type and the new type.



STEREO CASSETTE DECK

SONY®

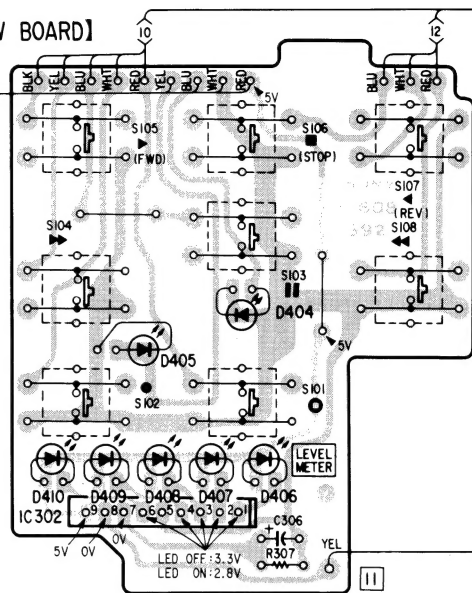
AUD

MOUNTING DIAGRAM

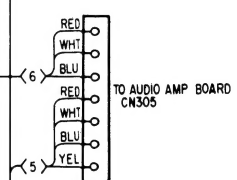
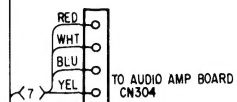
[CONTROL SW BOARD]

Note:

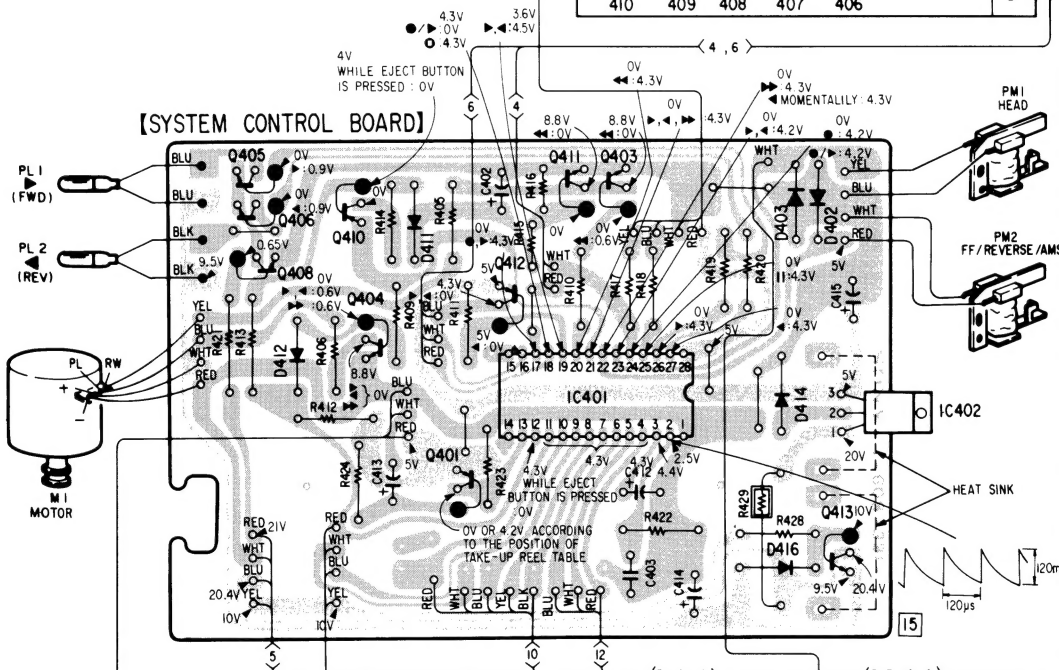
- : B+ pattern



IC302					IC
410	409	408	407	406	D

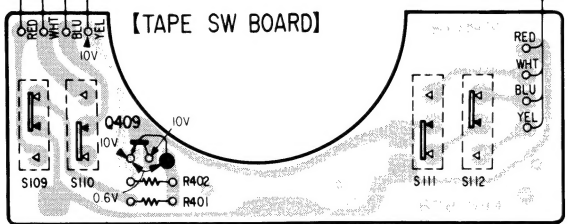


[SYSTEM CONTROL BOARD]

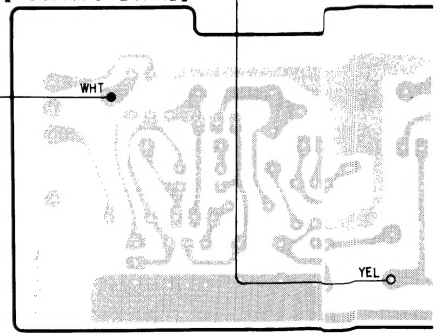


Q, IC	D
405 411	403 402
406 403	411
408 410	412
404	412
IC401	414
IC402	
401	
413	416

[TAPE SW BOARD]



[AGC/AMS BOARD]



[INTERRUPT BOARD]

0V OR 4.2V ACCORDING TO THE POSITION OF TAKE-UP REEL TABLE

S109 CASSETTE LOADING
ON
OFF

S110 ERASEPROOF TAB
↑ NO TAB

S111 TAPE SELECT TYPE I/III
↑ TYPE II/IV

S112 TAPE SELECT TYPE I/II/III
↑ TYPE IV

(WHILE EJECT BUTTON IS PRESSED: OFF)

Sony Corporation

—TC-2—

1/16 WATT CARBON RESISTOR

Ω	Part No.	Ω	Part No.	Ω	Part No.	Ω	Part No.	Ω	Part No.	Ω	Part No.	Ω	Part No.
2.0	—	13	—	91	1-210-354-00	620	1-210-367-00	4.3k	1-209-772-00	30k	1-210-380-00	200k	1-210-839-00
2.2	—	15	—	100	1-210-355-00	680	1-210-106-00	4.7k	1-209-773-00	33k	1-210-381-00	220k	1-210-840-00
2.4	—	16	—	110	1-210-356-00	750	1-210-107-00	5.1k	1-209-774-00	36k	1-210-394-00	240k	—
2.7	—	18	1-211-688-00	120	1-210-357-00	820	1-210-108-00	5.6k	1-209-775-00	39k	1-210-382-00	270k	1-210-841-00
3.0	—	20	—	130	1-210-358-00	910	1-210-368-00	6.2k	1-209-776-00	43k	1-210-383-00	300k	—
3.3	—	22	—	150	1-210-102-00	1.0k	1-204-122-00	6.8k	1-209-777-00	47k	1-210-384-00	330k	1-210-842-00
3.6	—	24	—	160	1-210-359-00	1.1k	1-210-369-00	7.5k	1-209-778-00	51k	1-210-385-00	360k	—
3.9	—	27	—	180	1-210-360-00	1.2k	1-209-765-00	8.2k	1-209-779-00	56k	1-210-386-00	390k	1-210-843-00
4.3	—	30	1-210-845-00	200	1-210-361-00	1.3k	1-210-370-00	9.1k	1-209-780-00	62k	1-210-387-00	430k	—
4.7	—	33	1-210-846-00	220	1-210-362-00	1.5k	1-209-766-00	10k	1-209-781-00	68k	1-210-388-00	470k	1-210-844-00
5.1	—	36	1-210-847-00	240	1-209-762-00	1.6k	1-210-371-00	11k	1-210-374-00	75k	1-210-389-00	510k	—
5.6	—	39	1-210-848-00	270	1-210-363-00	1.8k	1-209-878-00	12k	1-210-111-00	82k	1-210-390-00	560k	1-211-695-00
6.2	—	43	1-210-849-00	300	1-210-364-00	2.0k	1-209-767-00	13k	1-210-375-00	91k	1-210-391-00	620k	—
6.8	—	47	1-210-395-00	330	1-209-763-00	2.2k	1-209-768-00	15k	1-210-112-00	100k	1-210-115-00	680k	1-211-696-00
7.5	—	51	1-210-101-00	360	1-210-103-00	2.4k	1-209-769-00	16k	1-210-376-00	110k	—	750k	—
8.2	—	56	1-210-351-00	390	1-210-365-00	2.7k	1-209-770-00	18k	1-210-113-00	120k	1-210-836-00	820k	1-211-698-00
9.1	—	62	1-210-352-00	430	1-210-366-00	3.0k	1-210-372-00	20k	1-210-377-00	130k	—	910k	—
10	—	68	1-210-353-00	470	1-209-764-00	3.3k	1-204-123-00	22k	1-210-114-00	150k	1-210-837-00	1 M	—
11	—	75	1-210-392-00	510	1-210-104-00	3.6k	1-210-373-00	24k	1-210-378-00	160k	—	—	—
12	—	82	1-210-393-00	560	1-210-105-00	3.9k	1-209-771-00	27k	1-210-379-00	180k	1-210-838-00	—	—

1/8 WATT CARBON RESISTOR

Ω	Part No.	Ω	Part No.	Ω	Part No.	Ω	Part No.	Ω	Part No.	Ω	Part No.	Ω	Part No.
2.0	—	13	1-246-821-00	91	1-246-831-00	620	1-246-841-00	4.3k	1-246-851-00	30k	1-246-861-00	200k	1-246-871-00
2.2	1-246-751-00	15	1-246-761-00	100	1-246-771-00	680	1-246-781-00	4.7k	1-246-791-00	33k	1-246-801-00	220k	1-246-811-00
2.4	—	16	1-246-822-00	110	1-246-832-00	750	1-246-842-00	5.1k	1-246-852-00	36k	1-246-862-00	240k	1-247-054-00
2.7	1-246-752-00	18	1-246-762-00	120	1-246-772-00	820	1-246-782-00	5.6k	1-246-792-00	39k	1-246-802-00	270k	1-247-046-00
3.0	—	20	1-246-823-00	130	1-246-833-33	910	1-246-843-00	6.2k	1-246-853-00	43k	1-246-863-00	300k	1-247-055-00
3.3	1-246-753-00	22	1-246-763-00	150	1-246-773-00	1.0k	1-246-783-00	6.8k	1-246-793-00	47k	1-246-803-00	330k	1-247-047-00
3.6	—	24	1-246-824-00	160	1-246-834-00	1.1k	1-246-844-00	7.5k	1-246-854-00	51k	1-246-864-00	360k	1-247-056-00
3.9	1-246-754-00	27	1-246-764-00	180	1-246-774-00	1.2k	1-246-784-00	8.2k	1-246-794-00	56k	1-246-804-00	390k	1-247-048-00
4.3	—	30	1-246-825-00	200	1-246-835-00	1.3k	1-246-845-00	9.1k	1-246-855-00	62k	1-246-865-00	430k	1-247-057-00
4.7	1-246-755-00	33	1-246-765-00	220	1-246-775-00	1.5k	1-246-785-00	10k	1-246-795-00	68k	1-246-805-00	470k	1-247-049-00
5.1	—	36	1-246-826-00	240	1-246-836-00	1.6k	1-246-846-00	11k	1-246-856-00	75k	1-246-866-00	510k	1-247-058-00
5.6	1-246-756-00	39	1-246-766-00	270	1-246-776-00	1.8k	1-246-786-00	12k	1-246-796-00	82k	1-246-806-00	560k	1-247-050-00
6.2	—	43	1-246-827-00	300	1-246-837-00	2.0k	1-246-847-00	13k	1-246-857-00	91k	1-246-867-00	620k	1-247-059-00
6.8	1-246-757-00	47	1-246-767-00	330	1-246-777-00	2.2k	1-246-787-00	15k	1-246-797-00	100k	1-246-807-00	680k	1-247-051-00
7.5	1-246-818-00	51	1-246-828-00	360	1-246-838-00	2.4k	1-246-848-00	16k	1-246-858-00	110k	1-246-868-00	750k	1-247-060-00
8.2	1-246-758-00	56	1-246-768-00	390	1-246-778-00	2.7k	1-246-788-00	18k	1-246-798-00	120k	1-246-808-00	820k	1-247-052-00
9.1	1-246-819-00	62	1-246-829-00	430	1-246-839-00	3.0k	1-246-849-00	20k	1-246-859-00	130k	1-246-869-00	910k	1-247-061-00
10	1-246-759-00	68	1-246-769-00	470	1-246-779-00	3.3k	1-246-789-00	22k	1-246-799-00	150k	1-246-809-00	1 M	1-247-053-00
11	1-246-820-00	75	1-246-830-00	510	1-246-840-00	3.6k	1-246-850-00	24k	1-246-860-00	160k	1-246-870-00	—	—
12	1-246-760-00	82	1-246-770-00	560	1-246-780-00	3.9k	1-246-790-00	27k	1-246-800-00	180k	1-246-810-00	—	—

1/4 WATT CARBON RESISTORS

Ω	Part No.	Ω	Part No.	Ω	Part No.	Ω	Part No.	Ω	Part No.	Ω	Part No.
1.0	1-246-401-00	10	1-246-425-00	100	1-246-449-00	1.0k	1-246-473-00	10k	1-246-497-00	100k	1-246-521-00
1.1	1-246-402-00	11	1-246-426-00	110	1-246-450-00	1.1k	1-246-474-00	11k	1-246-498-00	110k	1-246-522-00
1.2	1-246-403-00	12	1-246-427-00	120	1-246-451-00	1.2k	1-246-475-00	12k	1-246-499-00	120k	1-246-523-00
1.3	1-246-404-00	13	1-246-428-00	130	1-246-452-00	1.3k	1-246-476-00	13k	1-246-500-00	130k	1-246-524-00
1.5	1-246-405-00	15	1-246-429-00	150	1-246-453-00	1.5k	1-246-477-00	15k	1-246-501-00	150k	1-246-525-00
1.6	1-246-406-00	16	1-246-430-00	160	1-246-454-00	1.6k	1-246-478-00	16k	1-246-502-00	160k	1-246-526-00
1.8	1-246-407-00	18	1-246-431-00	180	1-246-455-00	1.8k	1-246-479-00	18k	1-246-503-00	180k	1-246-527-00
2.0	1-246-408-00	20	1-246-432-00	200	1-246-456-00	2.0k	1-246-480-00	20k	1-246-504-00	200k	1-246-528-00
2.2	1-246-409-00	22	1-246-433-00	220	1-246-457-00	2.2k	1-246-481-00	22k	1-246-505-00	220k	1-246-529-00
2.4	1-246-410-00	24	1-246-434-00	240	1-246-458-00	2.4k	1-246-482-00	24k	1-246-506-00	240k	1-246-530-00
2.7	1-246-411-00	27	1-246-435-00	270	1-246-459-00	2.7k	1-246-483-00	27k	1-246-507-00	270k	1-246-531-00
3.0	1-246-412-00	30	1-246-436-00	300	1-246-460-00	3.0k	1-246-484-00	30k	1-246-508-00	300k	1-246-532-00
3.3	1-246-413-00	33	1-246-437-00	330	1-246-461-00	3.3k	1-246-485-00	33k	1-246-509-00	330k	1-246-533-00
3.6	1-246-414-00	36	1-246-438-00	360	1-246-462-00	3.6k	1-246-486-00	36k	1-246-510-00	360k	1-246-534-00
3.9	1-246-415-00	39	1-246-439-00	390	1-246-463-00	3.9k	1-246-487-00	39k	1-246-511-00	390k	1-246-535-00
4.3	1-246-416-00	43	1-246-440-00	430	1-246-464-00	4.3k	1-246-488-00	43k	1-246-512-00	430k	1-246-536-00
4.7	1-246-417-00	47	1-246-441-00	470	1-246-465-00	4.7k	1-246-489-00	47k	1-246-513-00	470k	1-246-537-00
5.1	1-246-418-00	51	1-246-442-00	510	1-246-466-00	5.1k	1-246-490-00	51k	1-246-514-00	510k	1-246-538-00
5.6	1-246-419-00	56	1-246-443-00	560	1-246-467-00	5.6k	1-246-491-00	56k	1-246-515-00	560k	1-246-539-00
6.2	1-246-420-00	62	1-246-444-00	620	1-246-468-00	6.2k	1-246-492-00	62k	1-246-516-00	620k	1-246-540-00
6.8	1-246-421-00	68	1-246-445-00	680	1-246-469-00	6.8k	1-246-493-00	68k	1-246-517-00	680k	1-246-541-00
7.5	1-246-422-00	75	1-246-446-00	750	1-246-470-00	7.5k	1-246-494-00	75k	1-246-518-00	750k	1-246-542-00
8.2	1-246-423-00	82	1-246-447-00	820	1-246-471-00	8.2k	1-246-495-00	82k	1-246-519-00	820k	1-246-543-00
9.1	1-246-424-00	91	1-246-448-00	910	1-246-472-00	9.1k	1-246-496-00	91k	1-246-520-00	910k	1-246-544-00

HARDWARE NOMENCLATURE

Screw:

P 3 x 10

L: Length in mm

D: Diameter in mm

Type of head

Indicated slotted-head only.

Unless otherwise indicated, it means cross-recessed head (Phillips type).



Nut, Washer, Retaining ring:

N 3

Diameter of usable screw or shaft

Reference designation

Reference Designation	Shape	Description	Remarks
SCREWS			
P		pan-head screw	binding-head (B) screw for replacement
PWH		pan-head screw with washer face	binding-head (B) screw and flat washer for replacement
PS PSP		pan-head screw with spring washer	binding-head (B) screw and spring washer for replacement
PSW PSPW		pan-head screw with spring and flat washers	binding-head (B) screw and spring and flat washers for replacement
R		round-head screw	binding-head (B) screw for replacement
K		flat-countersunk-head screw	
RK		oval-countersunk-head screw	
B		binding-head screw	
T		truss-head screw	binding-head (B) screw for replacement
F		flat-fillister-head screw	
RF		fillister-head screw	
BV		brazier-head screw	

Reference Designation	Shape	Description	Remarks
SELF-TAPPING SCREWS			
TA		self-tapping screw	ex: TA, P 3 x 10
PTP		pan-head self-tapping screw	binding-head self-tapping (TA, B) screw for replacement
PTPWH		pan-head self-tapping screw with washer face	binding-head self-tapping (TA, B) screw and flat washer for replacement
PTTWH		pan-head thread-rolling screw with washer face	binding-head (B) screw and flat washer for replacement
SET SCREWS			
SC		set screw	
SC		hexagon-socket set screw	ex: SC 2.6 x 4, hexagon socket
NUT			
N		nut	
WASHERS			
W		flat washer	
SW		spring washer	
LW		internal-tooth lock washer	ex: LW3, internal
LW		external-tooth lock washer	ex: LW3, external
RETAINING RINGS			
E		retaining ring	
G		grip-type retaining ring	